FOOD Manufacture

Incorporating Canning, Packing, and Preserving

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

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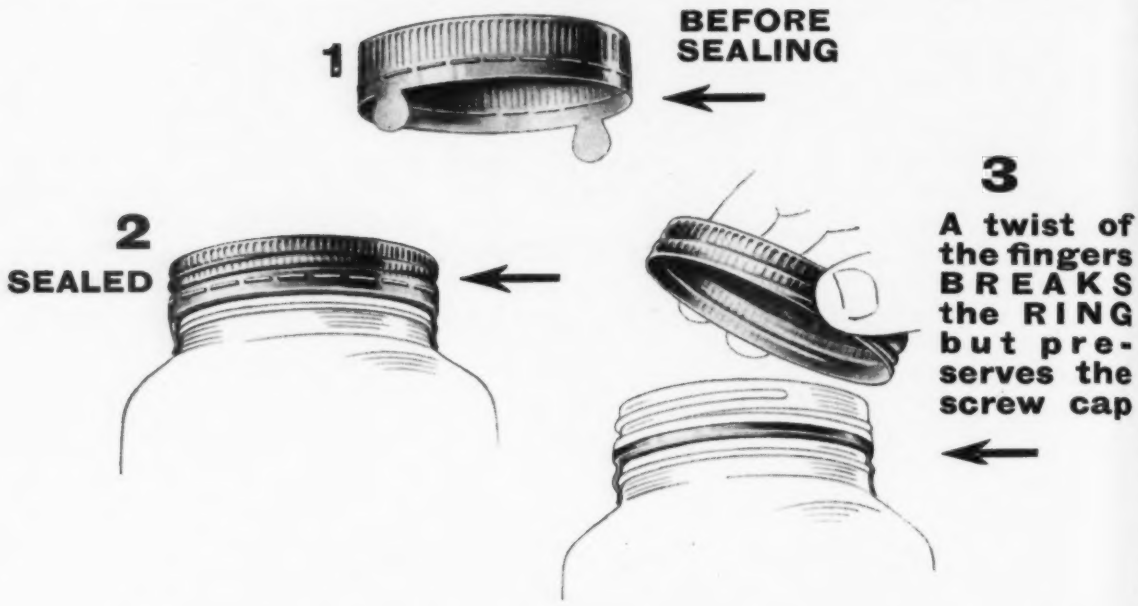

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Food Manufacture

Incorporating Canning, Packing, and Preserving

Vol. VII. September, 1932 No. 9

Flour Grade.

ONE OF the most familiar methods for determining the grade of flour is the Pekar test. In this test the flour is flattened out on a slab of glass or slate and carefully drawn through water. Low-grade flours rapidly become brown. A more recent test employs nitric acid. An aqueous extract is prepared by shaking 1 part of flour with 10 parts distilled water for 20 minutes and filtering. To 100 c.c. extract is add 1 c.c. nitric acid (S.G. 1·40). The solution becomes milky and flocculates out on standing if a low-grade flour has been used. The extract of a patent flour does not coagulate in 24 hours (maximum extraction of patent flour 42 per cent.). The explanation is probably the presence of more nucleo protein originating from the aleuron and bran cells in low-grade flour than in patent flour. Nucleo protein itself is rapidly coagulated by nitric acid. The age of wheat used for milling and the age of the flour do not influence the results. The flocculation takes longer with extracts from hard wheat than from soft wheat.

Wheat and Ultra-Violet Light.

The largest and soundest grains of wheat when examined in Wood's light show a blue fluorescence, whereas grains which have been damaged by excessive moisture during growth exhibit a yellow fluorescence. The fluorescence is to some extent characteristic of the variety, and uniformity of fluorescence indicates homogeneity of variety and of condition of growth and storage. In this way mixed consignments may be readily detected. Blue fluorescence of sound grains is changed to yellow by alkalies and restored by acids. Other seeds present as impurities have their characteristic fluorescences by which they may be recognised; in fact, impurities in flour are more readily detected and determined by the microscope in ultra-violet than in ordinary light.

Tinezol.

We understand that a new non-rusting adhesive has been developed by the British Food Manufacturers' Research Association and has been given the name of "Tinezol." According to the manufacturers, it is now possible to prepare pastes and gums which do not cause exposed iron base plate to rust. This preparation will be of undoubted interest to the canning industry, and doubtless the new adhesive will receive a thorough test.

Potato Bread.

At the last annual meeting of the American Society of Bakery Engineers, held in March, Mr. J. Cryns gave an interesting address on rye and potato breads. Apparently the extreme limit of potato flour that can be used in bread is about 20 per cent. of the flour. In tests made by Mr. Cryns on the baking of many kinds of bread, especially rye bread made with an addition of up to 3 per cent. of potato flour, he was unable to find any characteristic change in the loaf beyond its remaining fresh for a considerably longer time. When, however, 5 per cent. or more had been added, a noticeable change took place in the general character and taste of the bread. The crumb took on a peculiar silky softness, without being inelastic or doughy, and retained an agreeable and fresh condition for an exceptionally long time. It would therefore appear that the designation "potato bread" should be given to the product containing 5 per cent. or more of potato flour.

Apart from the agreeable and appetising taste of potato bread and its good keeping quality, it is relatively rich in mineral matter consisting largely of potassium phosphate.

Mr. Cryns' advice on the production of rye bread is quoted on another page of the present issue.

Can Sizes and Labels.

We have given some prominence to a plea for greater uniformity in Empire regulations relating to the packaging of foodstuffs as a means of facilitating inter-Empire trade. One of the most obvious questions requiring immediate attention is that of the standardisation of the various sizes of cans throughout Empire countries. Not only should the height and diameter of each size be the same for each country concerned, but a corresponding definite cubic capacity should be agreed upon.

Labelling is another matter upon which there should be a common policy. Labels should declare the net contents and also the name of the producer or responsible purveyor. As matters stand at present one would require the services of a private detective to track down the origin of some brands offered on the market.

We understand that the Empire Canning Council have been invited by the Dominions to take the lead in this matter. Nothing could be more desirable and we look to the Council to make the most of this splendid opportunity to render Empire canning an invaluable service. We have it on good authority that South Africa, for instance, would welcome certain kinds of British canned fruits, and there are no doubt varieties of fruits canned in South Africa which should be encouraged by every possible means to find a ready market over here.

Empire Canning Research.

The other day we discussed another suggestion of great significance to Empire canning with Mr. S. Craig Bain, Chairman of the South African Food Canners' Council and General Manager of the African Canning and Packing Corporation, who was over in this country on a visit of a few weeks. This suggestion is none other than the establishment in each of the Dominions of a canning research station on the lines of Campden, with the latter functioning as the controlling and co-ordinating body.

Mr. Craig Bain paid a visit to the Campden Research Station and expressed to us his high appreciation of the work carried out there, and, indeed, it was this recognition of the valuable services rendered to British canning by Hirst and Adam that suggested the idea of extending the work to other parts of the Empire.

We understand that it is in fact the ambition of the South African Food Canners' Council to establish its own research station, and that already, with this in view, Mr. Craig Bain's chemists are engaged in collecting data to serve as a basis for the project.

There is little doubt but that there are in every part of the Empire men of the same progressive spirit and breadth of view as Mr. Craig Bain. The only thing that is lacking is the co-ordinating and linking-up factor. Why not the Empire Canning Council?

Dairy Produce in 1931.

Some very interesting facts and figures about dairy produce supplies in 1931 are to be found in the report recently published by the Empire Marketing Board. Including pig products, the value of the dairy produce averages 30 per cent. of the total imports of food, drink, and tobacco. The production of milk powder, sweetened and unsweetened, by factories in Great Britain was 134,000 cwt., an increase of 13 per cent. on the 1924 production. Eggs in shell are imported from twenty-nine enumerated countries, Denmark leading with 7,548,000 great hundreds; the Irish Free State is second with 4,575,000. 1931 is described as the peak of the pig cycle. Great Britain imported 11,137,829 cwt. of bacon, 21 per cent. more than in 1930, which was then a record year. In 1928 Lithunia sent us 1,875 cwt., valued at £7,458. Last year she sent 362,381 cwt., valued at £876,978. The number of pigs in the United Kingdom increased by 19 per cent., but there are signs that breeding has been relatively unprofitable.

Milk in Breadmaking.

The use of milk in breadmaking is increasing, and in some respects milk brings about improvement. The milk albumen, however, causes a decrease in volume of the fermenting dough, and whey from which the albumen has been removed is better in this respect than untreated whey. If the milk or milk product is boiled an increased volume results, owing to the fact that the albumen is coagulated by the heating and rendered comparatively inert in its effect on the holding power of the gluten. Lactose has no effect on the volume, but small quantities of lactic acid produce a slight improvement. Whey products increase the rate of evolution of gas from a fermenting dough, whereas separated milk (raw or boiled) decreases the rate of gas evolution. This is probably due to the fact that casein has an inhibitory effect which more than counterbalances the beneficial effect of the phosphate. All milk products improve the texture, flavour, and colour of the finished loaf.

Frozen Assets.

This is not the first time we have deplored the petrifying formality of English conventions, society meetings, and so forth. On the other hand, the Americans certainly have the happy knack of investing theirs with plenty of tne merry and bright atmosphere. We have been glancing through the bulky proceedings of the ninth annual meeting of the American Society of Bakery Engineers, and found much that is both useful and entertaining.

Dr. Bradley, of People's Church, Chicago, had some hard things to say about banks. "Why is it that 'frozen assets' are now the magic phrase that explains so many collapses of banks? . . . The bank

examiners find the bank's assets frozen. Then the bank shuts up and liquidates the frozen assets. Then they declare a dividend. And the receiver gloats over his achievement. But look at his expense bill!"

"What Security?"

"You go and put $5,000 in a savings deposit," continued Dr. Bradley, "and you walk out with a little red book. That is all you get. But you go and try to borrow $5,000 and see what you leave before you walk out!"

Dr. Bradley related the story of the banker who had an accident and lost an eye. He had a glass eye, of which he was very proud. He was sitting at his desk one day when a baker came in and said, "Mr. Banker, I want a loan of $1,000."

The banker said, "Well, that is fine." And then the next little question: "What security?" You know, the tragedy of the world is that the people who need credit are the ones who haven't got it. The fellow who has the security is the fellow who makes the loan, and 90 per cent. of the time the fellow who needs the money is the fellow who has no security. That is the way of the world. So he looked at the banker, and the banker said, "What security?"

He said, "Mr. Banker, I haven't any. I am awfully sorry." And then he told him the story of why he needed the thousand dollars, and he told it so beautifully and so artistically that even the poor old banker himself was touched and moved to tears. But he didn't want to give up. Finally he said, "Well, I'll tell you, I will gamble with you. I've got one glass eye. If you can pick it out, I will make you the loan and I will make it out of my personal account, as an individual."

The fellow looked at him for a moment. Then he raised his finger and placed it on the banker's glass eye. The banker said, "My God! you have guessed it. You are right, that is my glass eye. How did you tell it? Nobody else is able to."

The fellow said, "Well, I looked at both eyes carefully and that eye had a little touch of human sympathy!"

Bakehouse Wisdom.

"The basis of American prosperity is steel."

"My father and mother are in the iron and steel business. Mother irons by day and father steals by night."

To a nervous speaker: "Don't get worried. No one who heard you in Syracuse last year will be here to-night."

"Ballyhoo isn't going to help a great deal in selling."

A comment on two French bread formulæ: "If they were made in San Francisco or Los Angeles during the rainy season and the driver had them on his wagon for four to eight hours, you could make a necktie out of each loaf."

"Is Ed Clissold in the room and Charley Oliver? . . . Mr. Clissold led the convention in singing 'Hail, Hail,' and 'My Wild Irish Rose'."

Baker's Foreman: "When I was your age, I never told a lie." Boy: "At what age did you start, then?"

Boss to office boy who asked for time off to get his hair cut: "Do you mean to say you want to get time off to get a haircut on company time?" Boy: "Well, boss, it grew on the company's time."

"When the pan greaser and the manager are both working for the same aim, you must ultimately attain success." (Applause.)

Pies.

"Our next subject on the programme is pies. All you fellows ought to be interested in pies, whether you make them or not. You look like a bunch of pie eaters to me. So let's go and see if we can't get some information. How many of you men like pies? Raise your hands, please. Good pies, I'm talking about." (Practically all.)

Referring to members standing outside in the lobby and talking: "If they are not here to attend the convention, let them go home. We don't care." (Applause.)

"The first subject will be cookies, by a Chicago boy, Mr. Virgil Essel." (Applause.)

"How many use hydrogenated fat for frying doughnuts?" (Several.) "How many use lard? I see only one hand."

"We will have a song or two, led by that greatest passer of bucks, Bill Doty." (Songs.)

"In our plant we have a tasting table and every morning I look at it and let somebody else do the tasting."

"What is the best shortening to use in a rolled-in dough?" "The best way to put it is, of all the women in the world, which is the best to pick for a wife?"

Flavours.

"Now, there is quite a difference of opinion with regard to flavour. Sometimes you want vanilla and lemon, or lemon straight, then emulsions, and again, just like it happens in our country, for six months it goes fine, the stuff tastes wonderful, until the wife of somebody in the company thinks it doesn't taste so good and somebody else's tastes better, and then we change our flavour."

"The photographers have arrived with the hit of

the season. We are about to see these pictures. While they are getting ready, I would suggest that if Ed Clissold is here and if Bill Stoneman is not here, we have a song." (Singing.)

Beverage Convention.

The American bottlers of carbonated beverages are to hold an annual convention and international exposition at Cleveland, Ohio, on November 14 to 18. An invitation is extended to all members of the beverage industry in every country. Those who are fortunate in being able to attend this important function are assured of a hearty welcome. Every possible provision has been made for the comfort and entertainment of members and their families. This will be one of the largest and most varied exhibits of industrial equipment and supplies ever assembled, and there will be ample opportunities for hearing every phase of the beverage industry and its problems discussed by eminent authorities. A novel feature will be the holding of a short course for bottlers, dealing with everyday problems in beverage manufacture, including such subjects as a comparison of the various methods for making, sterilising, and storing simple syrup (by Professor J. H. Buchanan), and the proper handling of colour and acid solutions (by Dr. Toulouse).

Particulars may be obtained from the Secretary of the American Bottlers of Carbonated Beverages, 726-729, Bond Building, Washington, D.C.

Coppered Plums.

According to Han and Chao in a recent issue of the *Lingnan Science Journal* (China), Tsing Mei is a kind of preserved plum, coloured with basic copper acetate, much consumed with confectionery in China. The authors found that 1 kilogram of the fresh fruit would contain 84 mg. of copper, and they are anxious to see some one carry out physiological tests in order to ascertain whether the consumption of a large quantity of Tsing Mei would be injurious to health.

Meat-Eaters Reply to Vegetarians.

Since the beginning of recorded history controversies have raged between vegetarians and meat-eaters, the vegetarians claiming that their diet gave them "peace of body and soul." According to Professor Wakeman this "peace" becomes mere "indifference and lassitude," for he reported to the American Chemical Society that he has found vegetarians, who have been on "weed" diet seven years or more, have an average basal metabolism 10 per cent. lower than the average for a similar group of meat-eaters.

Dr. Wakeman and two assistants conducted tests on seventy persons living on a vegetarian diet in the United States, London, and Geneva.

All showed a marked decrease in the vital function known as basal metabolism, the heat-energy production ability of the body.

Dr. Wakeman believes that all cells of the body are altered in character and function by the vegetable diet.

Plant Nutrition and Wheat Composition.

Every miller and most bakers know that varying types of wheat from the milling and baking points of view are produced in different parts of the world. In some localities hard, vitreous wheats are produced with a high protein content which are particularly suited to bread making. In other parts soft wheats, more suitable for cake and biscuit making are grown. What exactly is the cause of the difference? Why should the best wheat grown in England be less suitable for bread making than some of the inferior wheats of Canada? There are probably two factors —genetic and environmental—and although the variety of wheat grown accounts for some of the differences observed, there is no doubt that changes in environment can bring about fundamental changes in the nature and properties of the wheat grown.

Much work has been done to elucidate the changes which occur in the development of the wheat berry. Woodman and Engledow in 1924 found that the development of the berry may be divided into three growth periods: (1) Up to 40 days after heading, when the water content increases; (2) from 40 to 50 days, when the moisture is roughly constant; (3) from 50 to 65 days, when a marked desiccation occurs. There is a gradual increase in nitrogen until the fiftieth day, and from the fiftieth to the fifty-fourth day there is an increase in protein at the expense of non-protein nitrogen. The first distinct signs of gluten formation occur about the fiftieth day. The mineral matter increases until the period of desiccation and then remains constant. This also applies to carbohydrates.

Some very interesting work on the subject has been done recently by Kraybill, who suggests that the protein content of wheat is dependent upon the relative amounts of carbohydrates and nitrogenous compounds made available to the developing grains. Long periods of maturity with abundant moisture produce a low protein wheat, because such conditions favour a greater abundance of carbohydrates: and, conversely, short periods of maturity, warm weather, and moderate rainfall produce high protein wheats. He discusses the influence of nitrogen and phosphatic fertilisers, but concludes that although the use of fertilisers does influence the quality of the wheat, the most important factor of all is climate. The quality of our English wheat is like our weather, very variable, but mainly poor.

Kuvertüren

Fabrikation

von Dr.-Ing. A. Laessig

Training Cacao Inspectors, Gold Coast.

Dr. Alfred Laessig gives his views on the manufacture of covering chocolate.

YEAR BY year the confectionery industry makes steady progress in all civilised countries, and it is therefore by no means surprising that the leading manufacturers are devoting more and more attention to the problems involved in the manufacture of covering chocolate.

Couvertures are essentially superfatted chocolate masses, possessing a much higher fat content than is present in best quality chocolates. The couverture mass should be capable of flowing freely in the warm condition, a fat-content of 30 to 32 per cent., such as is usually present in a good chocolate mass, being insufficient to impart the required flowing power, irrespective of whether the centres to be covered consist of fondant, marzipan, nougat, or any of the other usual ingredients. The couverture mass requires a fat content of at least 34 to 35 per cent., but even this figure is too low except for hand-dipping, where each individual sweetmeat is dipped with a fork into the warmed chocolate and then transferred to parchment paper or thin tin-plate where supplementary designs may be applied. This hand-dipping process, which was formerly customary in the industry, is, however, no longer employed to any great extent, and only in connection with the production of chocolates of exceptionally high quality. Since about 30 per cent. of the total weight of the latter may consist of couverture, it is clear that the question of cost of manufacture is only of secondary importance.

But the position is quite different when we come to consider the production of cheap confectionery, which is now carried out entirely on a mechanical basis. Owing to the nature of the machines used for this purpose, the covering mass requires to be thinner than formerly, and therefore calls for a higher fat content. In fact, where heavy coverings are required, a couverture containing at least 38 per cent. fat must be used, while thinner couvertures require a mass with a fat content varying from 40 to 45 per cent.

Serious problems in formulation arise as a result of an increase in fat content to as much as 44 to 45 per cent. For example, the pulverised cacao mass prepared from well-ripened cacao beans possesses an average fat content of 54 per cent. A viscous couverture mass intended for covering high-class chocolates by hand could therefore be prepared on the lines of the following recipe:

Sugar	...	...	50 per cent.
Cacao mass	...	...	32 ,, ,,
Cacao butter	...	...	18 ,, ,,

which results in a fat content of 35 per cent. Now, in order to effect an increase in the fat content, either

the sugar content or the amount of cacao mass must be reduced and an additional amount of cacao butter added. The alterations, however, can only be carried out within certain limits, for the reduction in sugar content dare not be pushed to the point where the bitter taste of the couverture mass becomes very marked. Again, the cacao mass content must not be reduced at the expense of a further increase in the amount of cacao butter owing to the appreciable reduction in the strong cacao aroma, resulting in an undesirably mild flavour.

These views, however, are entirely opposed to those put forward in the *Gordian*, for the recipes in that publication involve an increase in fat content of couvertures at the cost of a reduction in the amount of sugar. It has already been mentioned that there are limits to this reduction, for it is possible to arrive at a mixture of 84 per cent. cacao mass with 16 per cent. of sugar, which would taste almost as bitter as cacao mass itself. Attempts to introduce a blend of this character have immediately resulted in expressions of disapproval on the part of the consumers. Even in the case of couvertures of a very thin consistency—which have only become a practical proposition as a result of modern advances on the mechanical side and which result in the moderate increase of 10 per cent. in the weight of the chocolate—a minimum sugar content of 30 per cent. is essential in order to produce the necessary sweet flavour. Such a couverture can only be produced on the lines of the following recipe:

Sugar	30 per cent.
Cacao mass	54 ,, ,,
Cacao butter	16 ,, ,,

In the author's experience, a couverture prepared on these lines, when applied to the extent of 10 to 12 per cent., does not produce an excessively bitter or harsh flavour. Thirty per cent. of sugar is, however, the absolute minimum, and a further decrease would in all probability result in complaints.

Couvertures giving rise to an emphatically bitter flavour are only welcomed by the trade in connection with assorted chocolates of superior quality. They may embrace entirely different covering masses, but for cheap mixtures the bitter couverture has failed to achieve any popularity. It should, of course, be borne in mind that taste varies in different countries.

In the preliminary remarks to the effect that couvertures were really superfatted chocolate masses, or masses with, at any rate, a high fat content, a clue was given to the principles on which are based the large-scale manufacture of such masses. In general, it may be said that couverture manufacture is on exactly the same lines as that of moulding chocolate, the fundamental difference residing in the fact that a fat content of 30 to 32 per cent. is usually present in the latter. The principal modification in respect of the manufacturing procedure consists in the fact that the amount of cacao butter additional to the 32 per cent. is homogenised in the conche in the very last stage of manufacture of the couvertures.

In view of the unfortunate circumstance that the manufacture of good eating chocolate in many factories is open to severe criticism, the writer considers it desirable to discuss in some detail the various processes involved in couverture manufacture.

Gathering Cacao in Trinidad.

Choice of Beans.

The cacao beans to be used are selected from the same standpoint as that involved in chocolate manufacture. Of greater importance than the actual source of the cacao is the use of sound ripe beans. Even in respect of common, cheap couvertures, attempts should be made—the price factor permitting—to incorporate at least 10 per cent. of high-grade cacao (Arriba or Machala) with the 90 per cent. of ordinary cacao. The proportion of high-grade material should naturally be increased in the manufacture of more expensive couvertures in order to improve the taste and aroma, proportions of 20 to 30 per cent. being reasonable. For the very highest quality of couverture the following recipe for the cacao mass may be recommended:

Puerto Cabello	10 per cent.
Superior Trinidad	10 ,, ,,
Summer Arriba	40 ,, ,,
Superior Accra	40 ,, ,,

The following is a recipe for a first-class milk couverture:

Puerto Cabello	10 per cent.
Summer Arriba	20 ,, ,,
Superior Java	40 ,, ,,
Superior Bahia	30 ,, ,,

Ordinary milk couvertures, for which a pale colour is popular, require light-coloured cacaos such as Java, Ceylon, and, to some extent, even pale Bahia.

In this respect, the same factors apply as in chocolate manufacture—namely, that no efforts should be

made to concentrate on certain grades of cacao, more attention being given to the soundness and ripeness of the beans, as well as the flavour. Consideration of these factors is far preferable to adherence to a particular recipe. Some recipes acquired an exaggerated importance in the eyes of the chocolate manufacturers of former days.

Cleaning, Sorting, and Roasting.

An important point in couverture manufacture is the immediate thorough cleaning and sorting of the cacao beans prior to further treatment. An actual roasting process should not be undergone by cacao beans intended for couvertures, although this is unfortunately still a customary operation (at temperatures of 110 to 140° C.). Furthermore, the beans should not be dried in hot air, but merely allowed to mature in specially designed apparatus at a temperature of 70° C.—a temperature which should not be exceeded, owing to the destruction at 75° C. of the cacao enzymes which steadily generate a fresh cacao aroma.

The next stage consists in the careful drying, shelling, and winnowing of the cacao beans.

Refining.

Further operations such as melangeuring and refining proceed on the same lines as in chocolate manufacture, but special attention should be paid in couverture preparation to the thorough ventilation and drying of the masses while being stored in the intervals between the several refining operations. The reader is reminded that good couvertures require at least three passages through the rollers.

Conching.

Following on the refining operation comes the conching, which is carried out in the usual way for high-class chocolates. The vacuum type of conche is specially suitable for the conching of couvertures by virtue of its special construction, which ensures a thorough liquefaction of the fat present in the mass, while the application of a vacuum ensures thorough removal of every trace of harmful moisture. The final batch of cacao butter is then incorporated with the mass in the rotation conche, the emulsification and homogenisation of the mass being then completed by a final thorough conching operation.

Milk Couvertures.

Milk or cream couvertures are frequently employed for finer grades of confectionery. Just as in the case of milk chocolate, milk couvertures should never be prepared in such a way that the quantity of dried milk indicated in the recipe is directly added to the basic mass and the process completed by periodic

Cleaning Cacao Beans in Trinidad.
(Courtesy of the West India Committee.)

heating. If a satisfactory milk couverture is aimed at, there is no alternative but to prepare the following milk paste:

Dried milk	50 per cent.
Cacao butter	20 ,, ,,
Fine sugar	30 ,, ,,

This should on no account be heated; it is thoroughly refined on cold rollers three times in succession without being brought at any time into the warm room. At the close of the last milling operation the milk paste is poured into moulds in which it solidifies to hard blocks which require to be stored in cold rooms.

For the preparation of milk couvertures, the milk paste is softened at a moderately high temperature and incorporated in the rotation type of conche with ordinary simple couvertures in such proportion as to result in the desired milk content of the final milk couverture. A milk content of 25 per cent. is about the correct figure, in which case the basic couverture and the milk mass are mixed in equal proportion. If, however, a milk content of as low as 20 per cent. is required, then 60 per cent. of base couverture is incorporated with 40 per cent. of the softened milk paste. This procedure is an example of the correct and rational manufacture of milk chocolate, for it is only by working on these lines that the sensitive milk fat and milk vitamins can be safeguarded from permanent damage such as would result from exposure to intense heat. A further drawback of overheating is the serious deterioration in the milky flavour of the finished product.

A supplementary milk mass ("Milchzusatzmasse") prepared on these lines will, however, only possess a fat content of 32 per cent., which is rather small for a couverture. The defect is corrected by the use of a basic mass containing a correspondingly larger quantity of fat. To illustrate this point, the production of a milk couverture with a total fat-content of 38 per cent. with the aid of a supplementary milk paste of 32 per cent. fat-content requires a basic couverture mass with a fat-content of 42 per cent. The recipe for the latter would be somewhat on the following lines:

Sugar	36 per cent.
Cacao mass	44 ,, ,,
Cacao butter	20 ,, ,,

The final composition of the milk couverture would then be as follows:

Milk constituents ...	25 per cent.	(including 6 per cent. milk fat)
Sugar	33 ,, ,,	
Additional cacao butter	20 ,, ,,	(20 per cent. cacao fat)
Cacao mass	22 ,, ,,	(including 12 per cent. cacao fat)

This formula results in a total fat content of 38 per cent.

Pale-coloured milk couvertures have recently sprung into popularity, especially in connection with best quality assorted chocolates with which a certain number of bitter couvertures are mingled. A suitable high-class bitter couverture would be based upon a cacao mass of something like the following composition:

Puerto Cabello	20 per cent.
Superior Trinidad	25 ,, ,,
Summer Arriba	30 ,, ,,
Machala	25 ,, ,,

while the mass recipe for the couverture itself would be:

Sugar	40 per cent.
Cacao mass (as above) ...	50 ,, ,,
Additional cacao butter ...	10 ,, ,,

Another popular novelty at the present time is represented by the dark-coloured *malt couvertures* containing 2·4 per cent. of dried malt, which is best added in making up the basic mass, in which case a corresponding percentage of sugar would be omitted.

Almond Couvertures.

Very pale couvertures containing lightly roasted almonds or nuts are also in great demand, a typical almond couverture recipe being as follows:

Roasted almonds	20 per cent.
Cacao mass	30 ,, ,,
Sugar	40 ,, ,,
Additional cacao butter ...	10 ,, ,,

The very small percentage of additional cacao butter in the above formula is rendered possible by the fact that roasted almonds contain on the average about 60 per cent. of fat. It may be mentioned also that the latter emphasise the pale colour of the mass. Combinations of milk couvertures and almond couvertures can also be prepared, preferably in equal proportions.

Coffee Couvertures.

Coffee couvertures also play a fairly important part in the production of the best assorted chocolates and are produced by adding 3 per cent. coffee (Mocha) paste in the conche to the basic couverture mass. Coffee essence is on no account to be used in this connection, and suitable natural Mocha paste can be prepared by working up two parts by weight of roasted coffee beans with one part by weight of cacao butter in the melangeur and then refining the mixture three times.

General Considerations.

Blends of the above-mentioned representative couvertures—milk, almond, coffee, malt—provide the possibility of producing all possible flavours according to the fashion of the moment, but this is really only of relevance to the *confiseur* and does not actually concern the policy to be adopted in actual couverture manufacture. In the main, the latter should be guided by the following considerations:

1. Judicious selection of sound, ripe cacao beans.
2. Careful cleansing of the crude beans.
3. Mild maturing of the latter at a temperature of about 70° C. with avoidance of intense roasting.
4. Adequate shelling, breaking, and winnowing of the cacao beans.
5. Conversion of the kernels into the finest cacao mass by refining.
6. Amalgamation of the warm, liquid cacao mass with the best quality of dry and (if possible) pre-warmed fine sugar.
7. Refining of the mass on steel 5-roller installations at least three times, the mass being stored for 24 hours in the intervals between each milling operation in well-ventilated storage rooms, preferably maintained at a temperature of 60° C., and finally stored in *uncovered* moulds.

Only by careful adherence to the above points is it possible to produce really first-class couvertures.

The Cacao Butter.

It remains to be added that only best cacao butter should be added to the couverture mass, for it has recently been noted that certain manufacturers have been using extracted cacao butter for this purpose—*i.e.*, cacao fat obtained by extraction with benzol from inferior cacao waste. Such extracted butter, which inevitably contains impurities of benzol such as thiophene, toluol, and xylol, can on no account be regarded as pure cacao butter. Not only does the use of such extracted cacao butter destroy the distinctive quality of the resulting couverture mass, but its addition to chocolates and couvertures is forbidden by the food adulteration laws of certain countries.

Extent of Drying.

Another factor of importance from the manufacturing standpoint is the degree of desiccation undergone by the chocolate mass. Insufficient attention is paid to this point in many cases, and the amount should not exceed 4 to 6 per cent. The more complete the removal of moisture from the mass, the more attractive the resulting gloss and smoothness of the couvertures, irrespective of whether hand-dipping or mechanical covering is practised.

Brittleness.

A frequent cause of complaint on the part of confectionery manufacturers arises from the development of brittleness in the interior of couverture blocks after delivery to the customers. It is also not infrequently the case that the cracks which develop are so extensive as to result in the complete breaking-up of the block. The sole cause of this defect is incomplete removal of moisture as a result of neglect of

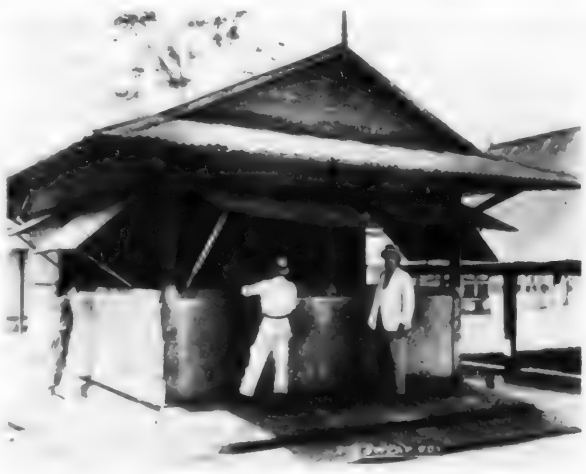
Drying Cacao Beans in Trinidad.
(*Courtesy of the West India Committee.*)

this important point on the part of the manufacturer. The development of brittleness in couverture production may be traced back to the following mechanical process, which is supported by ultramicroscopic observations. In the course of the rapid cooling of large couverture blocks—such as is usually practised—there naturally develops on the exterior a rigid impervious layer before the interior of the mass has had time to be effected by the cooling process. A considerable period therefore elapses before interior solidification can take place. The solid crust, however, forms a hermetic seal and a considerable amount of moisture is thus imprisoned in the interior with disastrous consequences. Water is absorbed by the cellular cacao ingredients, which begin to swell, while many of the sugar particles dissolve in the tiny drops of water distributed through the mass. The unfavourable effect of such processes on the mechanical stability of the block can readily be imagined, and it is no cause for surprise that fine cracks are in due course to be observed.

Now in order to avoid these defects it is essential to arrange for systematic desiccation of the mass in the course of the various stages of couverture manufacture. In the preparation of the basic mass, for example, only completely dry and preferably prewarmed fine sugar should be incorporated with the warmed liquid cacao mass. It often happens, however, that cold moist sugar is used for the basic mixture owing to the fact that fine sugar is extremely hygroscopic and will absorb several per cent. of moisture in the course of a few days when stored in sacks in cold and moist storage rooms.

Storage.

A second precaution consists in the storage of the semi-finished mass in the warmed rooms in *uncovered* moulds for 24 hours or (if possible) for 48 hours in order to permit of thorough evaporation of moisture. The *Gordian* has recommended the use of tight-fitting covers for the moulds, but this practice is definitely undesirable. The final and thorough removal of moisture from the couverture mass is best carried out in the conche, and no system is more effective in this connection than vacuum-rotation type of conche. The thorough removal of water is accompanied by the further advantage that a considerable amount of malodorous and unpalatable decomposition products are carried over at the same time. It is obvious that the thorough extraction of moisture and deleterious substances from the chocolate or couverture mass treated in this way must result in an appreciable improvement in quality. By carrying out the conching process on these lines, all those consequences associated with the development of brittleness and lack of firmness of the final couverture blocks can be avoided.



A "Sweat Box" in Trinidad.

Coloured Wrappers and Food Spoilage

COLOUR has a practical as well as an æsthetic value in wrapping foodstuffs to be stored for some time. Most colours permit the passage of the rays of light that promote spoilage. Only two—grass green and black—shut out those rays; the green, like the chlorophyll of plants, by absorbing the photo-chemically active wave-lengths of light, and the black by absorbing practically all the rays.

The effect of light on the deterioration of oil-bearing foods was shown in a recent study by food research chemists in the United States Department of Agriculture.

In one test two lots of the same meal were stored side by side for about a year, one in a glass bottle exposed to the direct sunlight and the other in a glass bottle wrapped in black paper. The meal in the wrapped bottle was fresh and sweet when removed; that in the unprotected bottle was spoiled, with a very rancid odour.

In another test a set of vials, one containing lard, one butter, and one salad oil, was placed in each of ten compartments, each compartment was covered with glass of a different shade, and the whole frame was exposed to sunlight. At the end of the experiment the material kept under the grass-green glass was still sweet, while that kept under the glass of any other shade of green, as well as of the different shades of blue, purple, yellow, orange, and red, was distinctly rancid. The same results were obtained when oil-bearing foods were wrapped in transparent cellulose wrapping of varying hues.

* * * * *

"People will go on using aluminium cooking vessels and wearing kilts"—so it was reported at a meeting of food chemists.

PREPARING GLACÉ CHERRIES

By J. ELSBURY

FOR GLACÉ work the best cherries are the Italian "Alpine"; next to these come the French "Whiteheart" and the Czecho-Slovakian. From all these glacé cherries for the confectionery trade may be prepared, but for liqueur and cocktail purposes the Alpine variety is the best, and the same applies to chocolate centres, maraschino and crystallised cherries.

Cherries are imported in the cask, some in brine and some in SO_2. The fruit may be either stoned or unstoned. With practice a girl will stone about 70 lb. a day. In the case of cherries intended for cake making, stoning is done by inserting a small gunmetal spoon at the stalk end of the cherry and withdrawing the stone, but for best work the cherry is split at the stalk end with a knife and the stone squeezed out between thumb and finger.

If brined cherries are used, the first step is to remove the salt. This is done by placing them in cold water for 24 hours and then into fresh cold water until all the salt has been removed.

In order to prevent them from becoming opaque they are then packed in a solution made up by adding 2 gal. of 5 per cent. SO_2 to 50 gal. of cold water, in which they are left for 48 or 60 hours, after which time they are ready for cooking. This must be done in a wooden vessel, such as a 100-gal. tank, heated by a closed copper coil beneath a false bottom.

The contents of two casks of cherries which have been prepared in the manner described are drained free from liquid, are emptied into the tank, and covered with cold water. The cherries are kept under the surface of the water by a loose-fitting wooden raft, which is let down on to them, and boiling is carried on for about 2 or 3 hours, allowing the boiling water to circulate freely. A little of one of the synthetic colours specially produced for cherries may be added at this stage, if necessary.

There are two ways of carrying out the syruping, which is the next stage in the process. For cheap goods or cake cherries it is done in bulk, with the cherries in 20-gal. tubs, while better class cherries are syruped in earthenware dishes.

Tub Process.

A syrup as described below should actually be made before the cherries are cooked:

White sugar	112 lb.
Water	25 lb.

Dissolve the sugar in the water, boil and skim, and then, after shutting off steam, add sufficient colour to tint the syrup to a light pink. Two cwt. of glucose are stirred in and when dissolved the syrup is poured into the tubs. The syrup should have a density of 20° Bé. at 212° F.

The cooked cherries, having been drained in baskets, are placed in the syrup as soon as it is cold, and left for 24 hours. The syrup is then drawn off and reboiled and skimmed in the steam pan (the more the syrup is skimmed, the brighter the cherries).

A second syrup, made by boiling 100 lb. of white sugar in 8 gal. of water, skimming, and adding to 100 lb. of glucose, is made and allowed to cool. It should read 38° Bé. at 212° F.

The first syrup is drawn off from the cherries each day and concentrated by boiling in a steam pan to the extent of a further 2° Bé. each day. When this has been done and the syrup is cold, 2 gal. of the second syrup are added and the syrup returned to the cherries.

By this process the first syrup eventually reaches 38° Bé. at 212° F., and the cherries should be allowed to stand in it at least 48 hours. The longer the cherries remain in the syrup, the heavier they become, and, of course, sugar and glucose cost less than fruit.

The cherries are drained on a sloping table, which has a perforated stainless steel top about an inch above the table-top itself. The tubs, full of cherries, are emptied on to the steel top, the syrup draining off through the perforations and being caught for further use. The cherries are allowed to drain overnight and packed as required, usually in sealed waxed cartons, to prevent leakage of the juice from the box or keg in which they are packed.

Better-quality Cherries.

The earthenware dishes used in this case are 3-gal. red clay pans, the cherries being prepared just as for the tub process. The cooked cherries are placed in the pans, half full of the first syrup, and allowed to stand 24 hours. Next day, the syrup should have become 25° Bé. when cold, and both syrup and cherries are turned into the steam pan, boiled up a further 2° Bé., when 2 gal. of the cold No. 2 syrup (38° Bé. at 212° F.) are added. The process is repeated daily until the syrup reaches 38° Bé. at 212° F. This is repeated three times at intervals of 48 hours between each boiling, and the cherries are drained in the usual way.

For chocolate centres, small Alpine cherries are best, mid-Alpines for cocktails, and large Alpines for maraschino.

Crystallised Cherries.

These cherries are made from cherries as prepared above, after they have been drained, and washing them in hot syrup (16° Bé. at 212° F.). They are drained and dried on wire trays in a room at 120° to 140° F. for 24 to 60 hours, being turned twice daily.

When dry they are packed, in layers three or four deep, in metal trays having perforated bottoms and wire mesh tops to hold the cherries down. The trays are returned to the stove (or hot room) and filled with hot syrup prepared as follows:

In a clean steam pan put 120 lb. of water; boil and shut off steam, next adding 3 cwt. of good hard grain sugar, stirring well.

Steam heating is resumed gently, stirring meanwhile, washing the sides of the pan so as to leave no sugar undissolved. Bring to the boil, and cease stirring, adding 20 drops of 33 per cent. acetic acid. Heat to 224° F., making sure the inside of the pan is free from grain. Shut off steam and take the syrup into the hot room, where it is poured over the cherries, which are covered over by sheets of wet paper and left in the hot room all night at 112° to 120° F. Next day the syrup is drained from the cherries, which are shaken out on to a wire tray, separated, and returned to the stove for thorough drying. When cold, they can be packed.

Maraschinos.

These are prepared as cocktail cherries, except for the liquoring, which is done in the following way:

Ten gal. of water are boiled and added to 70 lb. of white sugar, stirring until all is dissolved. Then add 6 pints of alcohol (spirits of wine) and 1 fluid drachm of oil of almonds. The syrup is filtered until bright, when the cherries are filled, capped, and processed in the same manner as liqueur cherries. The fruit should be large, whole, and of good colour.

RYE BREADS (*Continued from next page.*)

American Rye Bread—Sweet Rye: Straight Dough Method.

Straight rye flour	25 lb.
First clear flour	72 lb.
Potato flour	3 lb.
Water	62 lb. (apprx.)
Yeast	1½ lb.
Yeast food	3 oz.
Salt	2 lb. 2 oz.
Lecithin	¼ lb.
Malt	1½ lb.
Edible lactic acid (80 per cent.)	¼ lb.

Temperature, 75° F. Temperature of dough-room, 78° F. Time: Punch, 2 hours 45 minutes; pullover, 45 minutes; to divider, 30 minutes. Total time, 4 hours.

Rye Bread: Straight Dough Method.

Straight rye flour	15 lb.
Dark rye flour	7 lb.
First clear flour	25 lb.
Patent flour	50 lb.
Potato flour	3 lb.
Water	62 lb. (apprx.)
Yeast	1¾ lb.
Yeast food	¼ lb.
Salt	2 lb.
Malt	¼ lb.
Shortening	1 lb.
Molasses	1 lb.

Temperature, 76° F. Time: First punch, 3 hours; second punch, 1½ hours; to divider, ½ hour.

Sour Rye Bread.

	1st Sponge.	2nd Sponge.	Dough.
Straight rye flour	25 lb.	12 lb.	—
First clear flour	—	35 lb.	25 lb.
Potato flour	½ lb.	1 lb.	1½ lb.
Water	20 lb.	25 lb.	15 lb.
Prep. sour dough	3 lb.	—	—
Yeast	¼ lb.	¼ lb.	¼ lb.
Salt	—	—	2½ lb.
Caraway seed	½ lb.	½ lb.	½ lb.
Castor sugar	—	—	1 lb.

Temperature: First sponge, 76° F. Time, 5 hours.
" Second sponge, 74° F. Time, 4 hours.
" Dough, 75° F. Time, 10 minutes.

Milwaukee Rye Bread.

	Sponge. Lbs.	Dough. Lbs.
Straight rye flour	—	20
Dark rye flour	—	17
First clear flour	40	20
Potato flour	1	2
Water	25	40 (apprx.)
Prep. sour dough	—	8
Yeast	1	—
Molasses	—	1
Shortening	—	1½
Salt	—	2¼
Caraway, ground	½	½

Temperature: Sponge, 75° F. Time, 4 hours.
" Dough, 76° F. Time, 20 minutes.

RYE BREADS

JUDGED by the questions that have from time to time been put to us regarding the manufacture of rye breads and biscuits, there is evidently considerable interest in the subject. It is, however, not possible to draw up rigid and definite rules for the production of good rye bread. Formulæ which give excellent results in one country may give indifferent results in another. A careful study of all the factors involved is absolutely necessary. Below we quote some general remarks made by Mr. Josef Cryns in the course of an address to the ninth annual meeting of the American Society of Bakery Engineers, held at Chicago in March last.

There are two basic processes for milling the grain; one, in which the rolls are set close together, is known as the "Flachmuellerei," and the other, in which the rolls are further apart, is the "Hochmuellerei" method. Experience has shown that rye prepared according to the former method is to be preferred.

In the first place the grain is freed from all foreign substances and cleaned thoroughly. Then the rye is run through the crusher, whereby it loses its cylindrical form and is cut into roughly edged irregular pieces in preparation for the next rolls, the first set of reducing rolls, of which in most mills five sets are used. Therefore the crushed grain is generally ground into flour through five sets of rolls. The rolls are closely corrugated, because a speedy milling of the flour is the objective. Already by the first reduction the largest part of the flour, and also the best (about 30 per cent.), is obtained. The grits that form in the milling are run through smooth or only lightly corrugated rolls and milled into flour.

The number of reduction rolls and treatment of the grits vary in different mills. The average yield of flour from rye is 72 per cent. The loss from dust and evaporation averages 3 per cent.

The degree or percentage to which rye flour should be extracted depends upon the type of bread in which the flour is to be used. Mr. Cryns prefers always a straight flour, whereby is understood a flour of 80 per cent. extraction. This means, 60 to 62 per cent. of the flour milled from 100 lb. of rye grain. From a flour of that kind, provided it is milled from good sound rye, an excellent bread can always be baked.

The degree of acidity of the rye flour to be used is of vital importance and should always be known by the baker as well as by the miller, since it indicates whether a rye flour is sound or spoiled and whether it has been stored for too long a time. Rye flour of a higher acidity is also always of a higher extraction—therefore darker—than rye flour of a lower degree of acidity. Another useful point is that the gelatinisation of rye flour begins at 122° F. and ends at 131° F.

The percentage of wheat flour to be mixed with the rye has to be adjusted to the character or type of the bread that is to be produced. The more rye flour a baker can bring into the blend without reducing the volume of the loaf the more valuable is the product obtained. As a matter of course, the flour must be sifted before it is used. Thereby it is freed from possible impurities, loosened thoroughly and aerated, which, without question, improves the dough.

For rye doughs, especially those with a sour dough, and a high percentage of rye flour, a slow speed mixer is to be preferred. Since the heat from friction in these mixers is moderate, the required temperature of the water can be calculated easily from the temperature of the flour.

Salt must be dissolved in water, without question. It certainly is a mistake to add the salt in dry form to the dough and to leave a uniform distribution of the salt to the mixer alone. The leavening ingredients, such as yeast, sponge, or sour dough, must always be dissolved in a part of the water before the bulk of the flour is added to the dough. The mixing time for rye doughs should be as short as possible. The sponge and dough method, as well as the straight dough method, give equally good results. The last-named certainly requires more care and attention. Therefore the sponge and dough method is safer in its application.

Mr. Cryns prefers doughs held under a cool temperature of 74° to 76° F. to warmer doughs of 76° to 80° F. The time on the floor depends materially upon the percentage of rye flour added. The higher percentage of rye flour, the shorter the time on the floor.

The temperature of the proof box must not exceed 95° F. on account of the low degree of gelatinisation of rye flour. The relative humidity in the proof box must be held at about 85 per cent. Too much steam prevents, without question, a perfect forming of the crust.

The ideal proof time for rye breads is about 45 minutes. If bread needs a longer proof there is something wrong in the previous processing and fermentation of the dough.

It is advisable to "duk" the loaves before they are pushed in the oven. Top and bottom heat of the oven must be as near alike as possible. It is still better if at the start of the baking the bottom heat is the strongest. Plenty of wet steam surrounding the bread when it enters the oven is fundamental to success.

The bread must raise slowly and develop into its perfect form, which in 1-lb. loaves requires about 15 minutes. If the bread bakes round too quickly the fault lies in most cases with too much top heat, provided that the proof was correct.

If the steam in the oven is too strongly overheated the bread is apt to crack. Rye bread should start to swell about 10 minutes after it leaves the oven.

The following recipes were given by Mr. Cryns:

(*Continued on previous page.*)

SMALL SCALE

MARGARINE MANUFACTURE

By H. W. AVIS

THERE SEEMS NO DOUBT THAT THE MANUFACTURE OF MARGARINE CAN BE CARRIED ON QUITE SUCCESSFULLY, EITHER FOR THE MAKER'S OWN USE OR FOR PUBLIC SALE

THE QUALITY of margarine has improved enormously since the war. At the present time it is claimed to be almost indistinguishable from butter except by experts; the fact remains, however, that margarine can be used for many purposes other than as a butter substitute.

There is, for instance, "pastry margarine," which, besides being used for the purpose for which it is named, is also used in the manufacture of plain unsweetened biscuits, sometimes by itself and sometimes in conjunction with a shortening compound, according to the type of biscuit required.

Then, again, "cake margarine," designed essentially for the manufacture of cakes, is often slightly modified and used for the manufacture of sweetened and slightly sweetened biscuits. Other compounds can also be made by the judicious blending of fats, although it is not always necessary to put them through the entire process used for the manufacture of margarine.

Few manufacturers, especially those engaged in the baking industries, realise how usefully a small margarine plant could be adapted to their individual requirements, and could be used to ensure absolute uniformity of the finished article. A plant to manufacture some 5 to 15 tons per week requires very little labour to run, the overhead charges are low, and there need be no waste; any small quantities of fat which cannot be used can always be made into soap for cleaning down the factory.

Two steam-jacketed melting tanks, each holding about 8 cwt., are quite sufficient for a small plant. The correct mixture of fats is weighed in and melted, the necessary oil being measured in at the same time. From there the melted mixture is pumped into the tempering tank fitted with a rotary cooler, which is used for mixing the oils thoroughly and also for cooling to the necessary temperature; this is important, in order to obtain a stable emulsion in the next stage of the manufacture.

Several methods may be used to make a stable emulsion. First, there is the high speed emulsifier, of which there are several types now on the market. This is considered the most effective way of obtaining a stable emulsion of oil and milk. The machine consists essentially of a number of plates revolving at very high speeds with perforated baffle plates between, through which the oil and milk are forced in the correct proportion, which can be regulated before entry into the emulsifier. The emulsion is then led away to the cooler.

There is also the bulk churn into which the batch is run (the correct amount of milk being already in the churn) and stirred at high speeds. The churn is jacketed, thus enabling cooling to be carried out gradually until the mixture assumes the consistency of thick cream. Water may be added in the form of ice to assist cooling.

A margarine working churn can also be used; this combines the process of churning and working the margarine in one operation. In this case, the milk which has been mixed with an emulsifying agent is run into the churn and then the oils are added. The mixture is churned and cooled with ice water until solid, when it is worked up by means of the grooved rollers, arranged in the churn, while the latter is revolving. The excess of ice water is run off and the margarine is worked at a slow speed until it assumes the correct texture.

There are many methods of cooling the emulsion when it comes from the bulk churn or the emulsifier. One of the best is the cooling drum, which consists of one or more rotary drums cooled internally by means of brine. The emulsion is picked up on one side in the form of a thin film and scraped off the other in a solid condition. These drums can be adjusted to vary the thickness of the film required.

The emulsion can also be cooled by spraying ice water on it; this method is, however, not economical and is not to be recommended.

After the margarine has been cooled, it is allowed to stand for some time and is then worked up either with rollers or on a revolving table. At this stage the salt is added and the margarine is tested to see that it contains the required amount of water. Butter is now added if it is desired to blend the margarine, and after working up on a table the mass is finally transferred to a blending machine, which has knives working in opposite directions, thus imparting the smooth texture that is so important in the manufacture of margarine.

If margarine is for table use it next passes on to

the wrapping machine, which automatically cuts off and wraps the required quantity, the weight being checked occasionally. Otherwise it is packed in boxes directly from the blending machine, with the exception of pastry margarine, which is not usually blended.

Apart from the initial difference in the composition of pastry margarine the manufacture is the same.

In the general layout of a small plant such as the one described, all the machinery can be operated from shafting driven by one 20 h.p. electric motor, or each machine can be independently driven with an electric motor of either the chain or the gear type; this, of course, obviates any belt trouble likely to arise from misplaced grease or water.

The brine is stored in a well lagged tank fitted with cooling pipes from a small CO_2 refrigerator, the cooler of which must have an adequate supply of cold water. The brine tank, in which ice can also be made if required, is preferably situated in an insulated room, which can be used as a low-temperature margarine store.

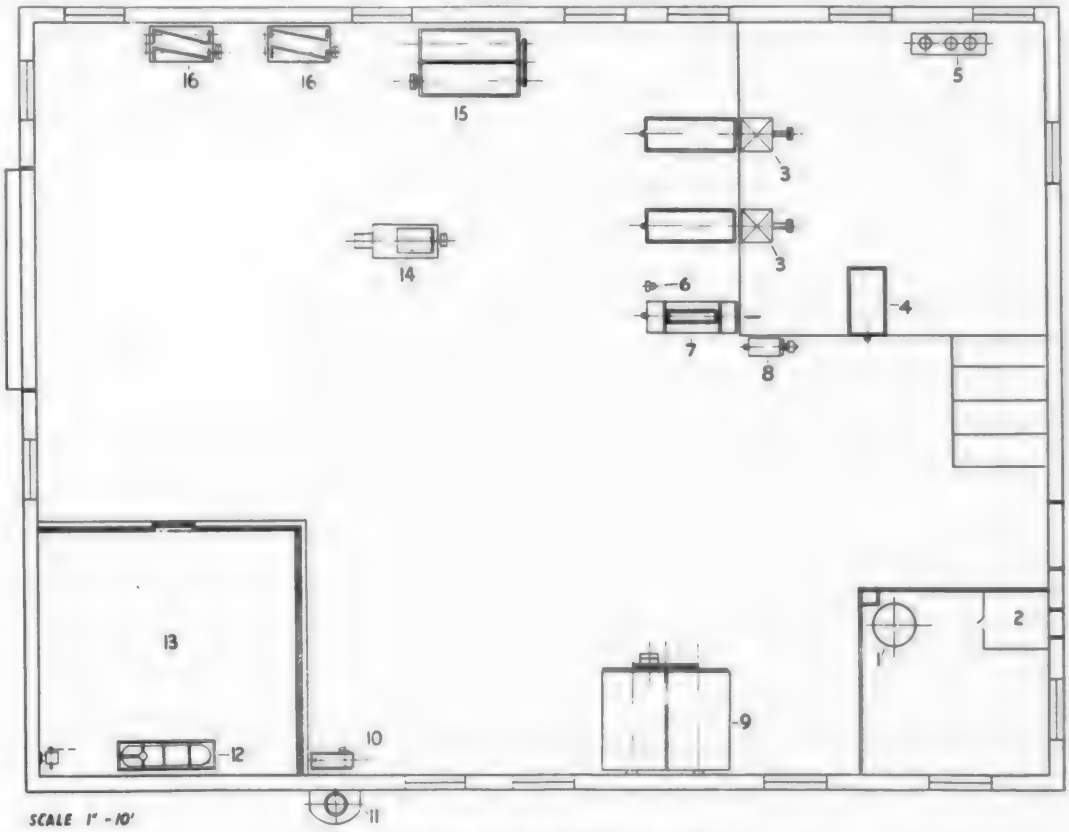
A low-pressure boiler of small capacity is required, giving about 50 lb. per square inch of steam, which is reduced to 20 lb. for the steam-jacketed tanks.

For the rest, good quality vegetable parchment paper should always be used and wooden boxes can be bought either ready made or can be assembled with the aid of a nailing machine.

The milk supply may be obtained ready separated from a contractor, or it can be treated with a small separator and pasteuriser on the premises, and after cooling should be put into a double-jacketed tank which can either be warmed or cooled with water according to the temperature of the atmosphere. The culture for souring the milk can be bought in solid form and propagated as necessary.

It is essential that absolute cleanliness is observed throughout the factory, as the smallest amount of dirt will spoil the flavour of the batch.

A strict observance of the laws relating to the manufacture of margarine and adequate distribution seem to leave no doubt that the manufacture of margarine on a small scale can be carried on very successfully by a manufacturer who requires it for his own use or for sale to the general public.



Layout for a Small Margarine Factory.

1. Boiler.
2. Coal dump.
3. Melting tanks.
4. Milk tank.
5. Starter cans.
6. Pump.
7. Tempering tank.
8. Emulsifier.
9. Cooling drums.
10. Refrigerator compressor.
11. Refrigerator condenser.
12. Brine tank.
13. Cold room.
14. Roll machine.
15. Rollers.
16. Blenders.

[*Raphael Tuck.*

The arrangement of the various Units of Plant under a single, vast expanse of roof, with generous floor space and lighting, is exemplified by this general view taken in the New Imperial Biscuit Works of Messrs. Macfarlane, Lang and Co., Ltd., at Osterley, near London.

[*Raphael Tuck.*

A spacious Laboratory, clean and well lighted, is an essential part of the biscuit factory planned according to present-day ideas. This view was taken in the Imperial Biscuit Works.

manufacturing BISCUITS

A few comments by one who was, until recently, engaged as a chemist in a biscuit factory.

BISCUIT MAKING is still regarded as more an art than a science. Many manufacturers prefer to keep the production of some of their leading lines a close secret and, for this reason, the manufacture of biscuits seems to be wrapped in mystery.

A great deal of trouble has to be taken to ensure that the finished article will reach the required state of perfection. The flour is chosen from the miller's specification, and experimental batches are made to see that the proper texture is reached. It is often impossible to change a strong flour for a weak or *vice versa* in the manufacture of one particular kind of biscuit. The soil in which the wheat is grown also has an effect on the flour; thus American, Canadian, and English varieties all vary considerably, and each finds an appropriate use in biscuit making.

A suitable kind of flour, or a blend of two or more having been found, various fats are next tested; butter is often used, especially when it is cheap, but margarine and various kinds of shortenings, lard or oleo are frequently employed, especially in the lower-priced biscuits. A disadvantage entailed by using one animal fat only is that such biscuits are frequently hard and tough. This can be obviated by the blending of fats with milk in the form of margarine, and very often a biscuit so made is almost equal to one made with butter and the cost of production is less. A margarine sold for table use will not give such good results as one which has been specially blended for the biscuit maker's purpose. Some manufacturers have their own margarine plant so that the margarine can be varied according to their requirements.*

Feeding Biscuit Shapes into a Travelling Oven.
(Courtesy of W. and R. Jacob and Co., Ltd.)

Sugar does not present such difficulties in its selection as the other components; as a rule, it is used in the granulated form, although it is sometimes ground down to a fine powder, but this is not often required, except for icing sugar or cream centres. Certain kinds, such as ginger biscuits, of course, require either treacle or syrup.

Milk also plays quite an important part, and is used either in the form of full-cream sweet milk or as butter milk. It is often pasteurised in the interests of general cleanliness, and this practice should be universal.

For the rest, the flavourings play a small part together with the chemicals, cream of tartar, soda bicarbonate, and salt, which are regarded as most necessary, also eggs and sometimes ammonia.

The entire mixing of flour, sugar, and chemicals is placed in a mixer, which has knives revolving slowly in it; these are of either a horizontal or vertical type. The fat is run in, then eggs, if necessary, and milk is slowly added until the mixture assumes the required texture, after which it is allowed to stand in the cool until ready for passing through the rollers to be reduced to the required thickness. Next it passes to the cutting machine, where the dies cut out hundreds of biscuits a minute, which are fed on to

* See the separate article on this subject on p. 264 of the present issue of FOOD MANUFACTURE.

trays carried through an oven by slowly moving chains.

The ovens of the present day are heated with coal gas or electricity; it is said that none equal in performance the coal or coke ovens of the past, but it remains to be seen how the latest electric ovens wear in comparison and whether they will eventually take the place of coal ovens. For some biscuits, gas alone is used.

The speed of the chains is regulated, as well as the heat of the oven, through which the trays proceed slowly until at the far end they are removed, the biscuits turned and allowed to cool. They are then packed either in packets or loose in tins, unless they are to be filled with cream or coated with chocolate, in which case they are passed on to other departments where girls spread them with a mixture of sugar and fat coloured and flavoured to requirements or dip them in chocolate.

With chocolate biscuits a great deal of attention is paid to the chocolate before dipping. After the chocolate is manufactured from the bean it is cast into slabs and stored until required, when it is melted down carefully, being stirred all the time so that it does not get too hot. As soon as it is melted, cold water is passed round the pan and the chocolate cooled until it reaches a certain thickness, when it is run into small pans ready for the biscuits to be dipped. This is usually done by girls trained for the purpose, as it requires a great deal of practice to become expert; there are, however, machines which will dip certain kinds of plain biscuits, though fancy designs are still done by hand.

The chocolate-coated biscuits are cooled to a fairly low temperature, in order to avoid the possibility of the chocolate going white or not having a gloss on it when finished.

The increase in the number of chocolate biscuits now sold is extraordinary, a few years ago not one-quarter of the present number were sold; the increase is chiefly due to the improvements made by some manufacturers in the quality of their chocolate, and there seems room for still more improvement in this direction.

Other kinds of biscuits require different treatment; oatcakes are made on a hotplate and wafer biscuits by pouring the mixture into a shallow pan into which another fits, the whole thing heated over the gas.

Shortbread is, as a rule, made by hand, and requires very careful treatment in order to ensure that it shall turn out correctly; it is also baked in a hand oven.

There seems to be room for a great deal of scientific investigation in the manufacture of biscuits, as not very much has been done up to the present time. For instance, neither the shape nor the size of the biscuits can be guaranteed exactly, and so the number of biscuits in a given weight must vary. Surely this type of problem should be tackled from a scientific point, as there are so many influential factors one or more of which might easily be missed by an untrained experimenter.

[*Raphael Tuck.*

In the Packing Department every possible precaution is taken to secure ideal conditions for the workers. These girls are preparing half-pound packets of chocolate biscuits in the Imperial Works.

Packing Biscuits into Tins.
(Courtesy of W. and R. Jacob and Co., Ltd.)

Packing Biscuits into Tins from an Oven Extension.
(Courtesy of W. and R. Jacob and Co., Ltd.)

Frozen Fruits

THE complete effects of refrigeration on fruit juices are not thoroughly understood, and many changes may take place which influence the properties of the fruits. It is interesting to note that Pickett has been examining blackberries, cherries, dewberries, peaches, pears, plums, raspberries and strawberries fresh, and after slow and quick freezing, for varying periods. The juices were examined by a number of physical and chemical methods such as hydrogen ion concentration, titratable acidity, depression of freezing-point, conductivity, and total solids. The juices from all these fruits, frozen and tested immediately, had greater titratable acidities than the juices from the fresh fruits. This is probably due to a breaking down, or increased permeability, of the cells upon freezing. The titratable acidity increased as length of storage increased, partly owing to dehydration. Since the juices of fruits frozen and stored at −12·2° C. have greater titratable acidities than those frozen at −73·3° C. and stored at −12·2° C., the juices of the fruits frozen at the lower temperature more nearly resemble the fresh juices in this respect.

Study for Fish Inspectors

CONTINUED increase in the efficiency of the fisheries service is the purpose served by the Canadian Department of Fisheries in requiring its inspectors to pursue special courses of instruction from time to time, and keen interest in these courses is shown by the officers concerned, who are not only helped themselves, but by their study are equipped to assist the fishermen in applying the most approved methods of handling and processing their catch.

Annual conferences, such as one held recently at Nanaimo and one at Halifax, are among other aids to efficiency which officers find most helpful. At these assemblies the department brings its supervisors and inspectors together for discussion of different problems in connection with their work.

Practical instruction in and lectures on the pickling, canning, salting, smoking, and other treatment of fish is included in these courses.

* * * * *

Extract of egg yellow is used to improve the quality of margarine. The product, which is obtained from egg yellow and margarine, is known as ovomargarin. The properties of this new product have been studied and are described by K. Taeufel and W. Preiss in *Margarin-Industrie*, 1931, pages 154 to 156.

Self-raising Flour in U.S.A.

SOME interesting details concerning the manufacture and consumption of self-raising flour were given recently by Edwin Cox to the American Millers' Association at Louisville. He pointed out that American diet has changed considerably in the last thirty years. The *per capita* consumption of cereal products has fallen from about 350 lb. in 1900 to 230 lb. now, a decrease of 35 per cent. In the same period the consumption of meats, fats and oils, dairy products, sugars, fruits, etc., have increased in amounts varying from 2 per cent. for meats to 72 per cent. for sugar. Among cereal products corn meal has suffered the most, falling from a *per capita* consumption of 103 lb. in 1899 to 22 lb. Wheat flour has fallen from 322 lb. to 171 lb., while at the same time bakery bread has increased from approximately 30 lb. per head to 90 lb. in the last thirty years. The home flour trade has fallen by 58 per cent., and, as Mr. Cox aptly remarked, the home baking flour trade appears to be between the upper millstones of decreasing flour consumption and the nether stone of increased bakery production.

In this period of declining family flour consumption, the statistics for self-raising flour are encouraging. It has increased annually at a rate more than twice as rapid as the growth of population. From 1925, when the country's production was not quite 7,000,000 barrels, it has steadily risen to 8,800,000 barrels in 1931, a *per capita* consumption of about 13 lb. and about 17 per cent. of the family consumption. The annual consumption of baking powder in U.S.A. is about 150 to 160 million lb., so that the flour leavened by this would be about 20 lb. per head or 25 per cent. of the total family flour consumption.

In the lecture above referred to Mr. Cox stated a minimum of $\frac{3}{4}$ per cent. of carbon dioxide is necessary to effect satisfactory leavening. The acid used for the liberation of the gas is generally acid calcium phosphate. As the gluten is more elastic at a slightly acid point, many millers use a small excess of phosphate over that required for exact neutralisation. This results in a better colour and texture. For an all-purpose self-raising flour the following formula is suggested:

Flour	100 lb.
Bicarbonate of soda	$1\frac{1}{2}$ lb.
Acid calcium phosphate	$1\frac{7}{8}$ lb.
Salt	2 lb.

The phosphate is often increased to 2 lb. Pancakes require a more rapid leavening, and for prepared pancake flours the leavening ingredients are increased to 2 per cent. of soda and $2\frac{1}{2}$ per cent. of phosphate. Baking research has shown that though soft wheat flours give shorter biscuit, they require a more balanced formula and greater care in leavening than do hard wheats. Clears and low-grade flours require more acid as their natural reaction is slightly alkaline. The rate of reaction must be controlled through the granulation of the phosphate, as the gluten will not hold the gas if it is evolved too rapidly, and, as a result, volume and texture are impaired. The flour should not contain more than 12·5 per cent. moisture, otherwise there will be a slight reaction between the acid and soda and part of the gas will be lost.

Publications Received

Index to the Literature of Food Investigation, Vol. 3, No. 2, September, 1931. Dept. of Scientific and Industrial Research. H.M. Stationery Office, London, 1932. Price 2s. 6d. net.

Cheese Making. Bulletin No. 43. Ministry of Agriculture and Fisheries. H.M. Stationery Office, London, 1932. Price 1s. net.

A practical handbook of instruction in the making of the principal varieties of cheese of England and Wales, compiled by specialists. This is an excellent handbook, and should be obtained by everyone interested in the subject.

Feeding Chickens, by M. A. Jull. Farmers' Bulletin No. 1541. U.S. Dept. of Agriculture. Revised February, 1932.

Full instructions as to the best methods of feeding chicks, market poultry, laying hens, and breeding stock, together with a discussion of basic principles.

Barley: Culture, Uses, and Varieties, by H. V. Harlan. Farmers' Bulletin No. 1464. U.S. Dept. of Agriculture. Revised February, 1932.

A detailed account of the distribution of the barley regions in U.S.A., the economics of barley growing, fertilisers, choice of seed, the various stages of cultivation, barley as a stock feed and other uses.

Bakery Science, by John Edmund Driver, M.Sc., Ph.D., A.I.C. Oxford University Press, London, 1931. Price 5s. net.

Contents: General chemistry, baking powders, the general nature of foodstuffs, sugars and sugar products, starches, wheat and flour, bacteria, moulds, yeasts, milk, butter, eggs, malt, flavourings, colourings, and preservatives. An elementary course of study.

Protein Tests for Wheat and Oil Tests for Flaxseed and Soybeans, by the Bureau of Agr. Economics. Miscellaneous Publication No. 140. U.S. Dept. of Agriculture, February, 1932.

A discussion of the significance of these tests to economic considerations.

Modern Methods of Quantitative Chemical Analysis, by A. D. Mitchell, D.Sc., F.I.C., and A. M. Ward, Ph.D., D.Sc., A.I.C. Longmans, Green and Co., London, 1932. Price 6s.

A selection of modern methods of analysis admirably arranged in a space of 178 pages—a convenient size for the pocket.

The Chemistry of Laundry Materials, by D. N. Jackman, M.Sc., A.I.C., A.M.I.Chem.E. Longmans, Green and Co., London, 1931. Price 6s.

An extremely useful and well-written little book embracing the scientific fundamentals of laundry practice. The subjects dealt with include: Water, alkalies, soaps, bleaches and the removal of stains, fibres and fabrics, starches, acids and blues, fuel, marking inks, disinfectants, etc., and general chemistry.

FROZEN FOODS IN AMERICA

RESULTS OF RECENT RESEARCH

ACCORDING to the Frozen Foods Association of America, valuable research in frozen foods is being conducted by the agricultural experiment stations in a number of widely scattered states. But for the economies made necessary by the depression, others which have shown an interest in the subject would probably have undertaken similar research.

Considerable progress has been made at the Government station at Seattle, Wash.; also at Atlanta, Ga., and at the University of California. At Gainsville, Fla., experiments have been conducted with unusual fruits, such as papyas, guavas, sand pears, avocados, youngberries, and other sub-tropical fruit, in addition to the work carried on in the freezing of orange juice, strawberries, and other products. At Amherst, Mass., the station of State College has been experimenting with frozen cranberries, in addition to similar work on other berries and fruits. The New York State station at Geneva has been doing independent work, as well as in co-operation with the Birdseye Packing Company, on fruits and vegetables. At Fargo, N.D., interesting tests which indicate commercial possibilities in the freezing of sweet corn have been undertaken.

The other stations which have conducted freezing research have, like North Dakota, confined themselves to the freezing of products grown locally, such as strawberries are in Arkansas and Louisiana.

The determination of what fruits and vegetables are best suited for preservation by freezing is the aim of most of the experimentation now being carried on, and in a number of cases the particular varieties of fruits and vegetables which can be frozen most satisfactorily are gradually being decided upon. The fact that a frozen product is in such a shape that it can be shipped without any of the attendant dangers which are inherent in shipping fresh products, makes it possible to consider as candidates for freezing many of the more delicate and highly flavoured varieties, both of fruits and vegetables, which hitherto have been grown only in small quantities because of the impossibility of shipping them long distances.

In order to permit exchange of information and informal discussion between investigators engaged in the study of preservation by freezing of fruits and fruit products, a technical conference was held by the Fruit Products Laboratory of the University of California at Berkeley on May 27. A number of interesting papers were read, followed by discussions.

Mr. Karl Ford, reviewing recent progress made in the application of quick freezing to the preservation of foodstuffs, declares that the development stage is being left behind and that frozen foods are assuming important commercial possibilities for the glass packer.

While frozen foods may not as yet be considered a complete commercial success, their possibilities, judging from the successful results obtained by different investigators, are very promising. Much information is still required, for the development of equipment, choice of packages, and proper selection of suitable varieties of fruits and vegetable products. Much education of the public will be required. However, there is little doubt that great progress can be expected.

The use of containers or other devices to protect the product from the brine has been almost universally adopted in present-day freezing equipment.

It should be remembered that freezing is not a sterilisation process. In fact changes result during freezing which make the products more susceptible to bacteriological spoilage. Thus the freezer is compelled to use exceptional care in selecting and handling the raw materials. All mouldy and decayed products must be thrown out, and in washing operations fresh water must be employed to prevent contamination.

Storage demands a close control of temperature. Fluctuations may cause a growth in the size of the ice crystals, which may nullify any advantage of the small crystals produced by rapid freezing.

More research on the action of enzymes is required. This field presents many problems concerning colour, flavour, and texture. Oxidation is another factor which may bring about undesirable changes in certain products, to counteract which vacuum packing is employed. Immersion in syrup is also used with the same object in view. Very little work has been yet done on the retention of the nutritive values in frozen foods, although it is stated that vitamins A, B, and D are uninjured by freezing. But the most pertinent problem facing the frozen foods industry is the selection of the particular products and varieties suitable for freezing.

Fish Foods

BETWEEN four and five hundred women were present at each of the lecture-demonstrations given in Toronto in April by Mrs. Evelene Spencer, specialist in fish cookery, who has been put in the field by the Dominion Department of Fisheries to carry on a programme of cookery demonstrations and addresses in the various parts of Canada with a view to widening popular knowledge as to the use of fish foods and thus helping to increase the consumption of the products of the Canadian fishing industry.

* * * * *

In the *Am. Journ. Pub. Health*, 1932, No. 4, Fabian points out that four of the United States have bacterial standards of control. The author defines what he considers a reasonable bacteriological standard for ice-cream, and suggestions are made for sanitary control by legal regulation.

Banana Flour

In the June issue (p. 175) we reviewed the present position with regard to banana figs, chips, and flour, and the possibility of popularising products into which banana flour entered as an ingredient. We quoted two views on this matter. One was: "We went very fully into the possibilities of working up a demand for banana flour, with biscuit manufacturers, vegetarian restaurants, and others, but we found that the small amount of interest that existed a few years ago has completely died out." The other stated: "For twenty years we endeavoured to make a trade for banana flour and products, but we gave it up as a bad job some years ago, having come to the conclusion that the public did not want it."

In face of these discouraging statements Messrs. Bushell Bros., Ltd., inform us that they have pursued their own investigations, including the submitting of samples of flour to an independent authority for a report on the results of cooking tests. We suggested to Messrs. Bushell Bros. that it would be in the interests of readers to publish the essential points set out in this report and they have very generously permitted us to do so.

The general conclusion reached by the authority consulted is that the results have proved that the very definite acrid taste of the flour renders it unsuitable for ordinary cooking purposes. In all probability the most satisfactory way of utilising it would be in the preparation of a patent food, incorporating it with dried milk, malted milk, or some other food material of very definite flavour which would mask the taste of the banana flour.

The report states that banana flour has been incorporated with different foodstuffs for the preparation of cooked dishes and beverages, but that no satisfactory method has been found to make it either palatable or pleasing to the eye.

In the case of beverages made with banana flour, the chief drawback was found to be in the mixing of the flour and liquid, as it was extremely difficult to obtain a really smooth paste.

The following beverages were tried out, but in every case the flavour was distinctly unpleasant:

1. Banana flour was mixed with cold water to a paste, boiling water added, and the mixture sweetened to taste. The result was unpalatable.

2. The above test was repeated, using milk, but again the acrid flavour and unpleasant odour made it most unattractive.

3. Dried milk and banana flour were blended together and boiling water added. The result was still unpleasant.

Experiments were also carried out with banana flour used in the making of the following cakes:

1. *Sponge Cake.*—Equal quantities of plain and banana flour were used with disappointing results, for the dark colour and the dominant flavour made it thoroughly unpalatable.

2. *Small Biscuits.*—Here, again, both plain and banana flour were used. The result was a hard, and, because of the unpleasant flavour, almost uneatable biscuit.

Banana flour was also incorporated with cornflour to make a cornflour mould. The colour of the cooked dish was definitely unattractive, and the unappetising flavour imparted by the banana flour made it unpalatable.

The conclusion is reached that banana flour is unsuitable for adding to beverages, cakes, or moulds as a means of introducing it into a child's diet. No opinion is given on its nourishing and digestive qualities, or its suitability as an ingredient in a patent prepared food.

Aluminium and Foodstuffs

The aluminium controversy still continues, and undoubtedly chemists are striving hard to obtain accurate data on which sane opinions can be based. An interesting study of the aluminium content of foodstuffs cooked in pyrex and aluminium has been carried out by several American workers, who conclude that a negligible amount is taken up by neutral foods, but acid and alkaline foods have more action. They state, however, that in no case is sufficient aluminium dissolved from utensils to interfere seriously with phosphorous absorption in an animal consuming the food. An average daily human intake of aluminium, when all foods are cooked in aluminium, is estimated at 12 mg., of which about 5 mg. are derived from the utensils. The increase in aluminium content varies from nil, in potatoes boiled in their jackets, to 49 parts per million in apricots cooked for forty minutes. The largest amount was 118 parts per million in "apple butter" which had been cooked for six and a half hours in an aluminium vessel. Cabbage cooked for forty-five minutes in glass contained 0·37 parts per million, in aluminium 2·78 parts per million, but when cooked with sodium carbonate there was an increase of 90·5 parts per million. Bacon cooked five minutes in glass gave 0·25 parts per million, and in aluminium only 0·68 parts per million, so that, at any rate, we can still use the aluminium frying pan.

GLUCOSE in SUGAR CONFECTIONERY and JAM

« « « A Discussion of its Functions

One of the most noteworthy features of the sugar confectionery industry is the changed attitude of public opinion, and with it that of the confectioner, in relation to glucose. Not so very long ago the idea prevailed that glucose was something in the nature of an undesirable adulterant in sweets, and even to this day there are jam manufacturers who are under the false impression that there is an advantage to be gained by advertising their products as being free from glucose. In this respect they lag behind the more progressive sugar confectioners, who have not been slow to fall into line with views widely expressed by the medical profession to the effect that glucose possesses valuable nutritive and therapeutic properties. Thus it is that these confectioners have opened up for themselves a new and lucrative field, and have followed up the initial advantage already supplied by medical opinion by adopting a positive policy of informing the public that their goods actually contain glucose, thereby creating an increased demand. Indeed, the public is beginning to regard glucose much in the same light, and for the same reasons, as it esteems barley sugar.

Thus the function of glucose in sugar confectionery may be regarded as twofold. In the first place it is of particular nutritional value, and secondly it plays an indispensable technical part in manufacture.

Glucose, or more accurately dextrose, which is the main constituent of glucose, is the sugar present in the blood and tissues, and the form into which all other carbohydrates must be converted before being utilised by the body. Requiring neither digestion nor chemical alteration, dextrose is the most rapidly absorbed form of carbohydrate when administered orally or by injection. It supplies energy in its most easily assimilable form. Thus it is that during the past few years medical authorities have increasingly prescribed glucose for its health value alone. As we have remarked above, the more alert confectioners have seized upon these facts and have turned them to their own advantage by proclaiming the glucose content of their products, even to the extent of incorporating the word in the names of their products, as instanced by "glucose chocolates." There is little doubt that before long the public will be rid of its last remaining vestige of prejudice, and that the pendulum will continue its swing to the opposite extreme.

The other function of glucose in confectionery—namely, its use as a "doctor" for cutting or controlling the grain—is more familiar to manufacturers, and we shall, therefore, confine ourselves to a brief review of the main technical points, adding some advice concerning its use in practice.

In nearly all classes of sugar confectionery, the development of sugar crystals, or grain—as it is more commonly known—must of necessity be either prevented, as in the case of hard-boiled goods, or retarded, as in the case of fondants and similar classes of goods. In order to achieve this object, a grain preventer must be added in large or small proportions, according to whether the desire is to prevent or retard graining, and for this purpose, we have the choice of (1) setting up invert sugar by the use of tartaric acid or cream of tartar, or similar inverting agent during the process of boiling, or (2) adding a proper proportion of glucose. When using the tartar killing method, the manufacturer is entirely in the hands of his operator. If the cream of tartar is added a little earlier than usual, or if the boil is a little slower than usual, then an increased amount of invert sugar will be set up, with the development of stickiness in the ultimate product, and whenever this method is resorted to, the finishing temperature has to be materially increased over and above that necessary when glucose is used for grain preventing in order to overcome the loss of viscosity due to the presence of invert sugar, which is by nature a syrup of very low viscosity. Therefore, with the cream of tartar method, one has to have absolute precision of operation (time, temperature, manipulation, etc.) or a quality of goods varying batch by batch.

If, on the other hand, glucose is used, providing the regular proportions are abided by, then the degree of grain-retarding power is identical batch by batch, with the result that a uniform high-class article is produced without any great degree of skill being required on the part of the operator.

It will be seen, therefore, that glucose has a very definite function, and possesses essential qualities that are missing in sugar, and is, therefore, in no sense a substitute for, but rather an absolutely necessary adjunct to, sugar in all classes of sugar confectionery.

As far as jam is concerned, the manufacturer is faced with the necessity of using invert sugar to prevent the development of crystals, and that well-known bugbear—surface crusting. If the invert sugar method is resorted to, then a thinner product is obtained, which necessitates either the use of an increased amount of pectin or additional concentration, whereas the replacement of 25 per cent. of the sugar by glucose will definitely prevent surface crusting, and yet leave the viscosity of the product unimpaired. In addition to this, the excessive sweetness of the jam is reduced, and in consequence the fruit flavours are enhanced, while the dietetic value of the product is improved.

THE VINEGAR CONTROVERSY CONTINUED . .

To the Editor.

DEAR SIR,

I would like to add a few more criticisms of the vinegar article (Part II.), which appeared in your July issue.

Your authors are not fully acquainted with the bacteriology of vinegar or they would not dismiss so readily the question of "Mother of Vinegar." This growth requires oxygen to survive. Infected vinegar without air will show no sign of "Mother." Admission of air immediately activates the bacteria and growth takes place *at the surface*, the slimy mass afterwards sinking to the bottom of the container.

Your authors are accurate when they say that vinegar bacteria will function with the minimum of food. In malt vinegar, even after oxidation is complete, there remains a surplus of suitable food sufficient for perhaps 100 times the repetition of the oxidation. If vinegar is properly pasteurised it will keep indefinitely however badly it has been brewed, provided it is cleanly handled. We have filled pasteurised vinegar into casks, purposely three-quarters full, and the vinegar has shown itself to be perfect after over six months' storage.

No vinegar brewer in this country is able to adhere to one strain of vinegar bacteria, and the particular type responsible for growth in vinegar is the most ubiquitous of them all.

The stability of vinegar through saturation with CO_2 would not necessarily persist after opening a bottle. Normally vinegar is saturated with CO_2 at N.T.P., but I would suggest your authors make a test of vinegar under CO_2 pressure. I hope they will publish the result of the test in FOOD MANUFACTURE.

I must protest against your authors' conclusion where they forecast the doom of the vinegar industry by referring to dilute acetic acid. The fault lies with the State and Ministry of Health, owing to the absence of scientific men in a scientific department. Ours is the only country in the world where a chemical substitute is allowed to bear the same description as a genuine article. Dilute acetic acid never was vinegar and never will be. The vinegar brewers are supposed to be fighting hard to secure a definition for genuine vinegar as against imitation vinegar, and when this is achieved a new era of hope will open for the vinegar industry and for the maltster and barley grower. Not only that, but millions in this country will suddenly realise that the vinegar, pickles, and sauce they have been using were all prepared as a dilute poison instead of being an article of food.

Yours faithfully,
G. W. HYDE.

To the Editor.

DEAR SIR,

We quite agree that oxygen is necessary for growth of "Mother of Vinegar," and if Mr. Hyde will refer to our article he will find that we purposely mentioned that its growth is due to a very limited air supply. As evidence of this, one has only to notice its growth, whether this be in a bottle, a barrel, or an acetifier. In a bottle one can see more easily how vinegar may be kept for a long period, but when it has once been opened, "Mother" will begin to develop. To our knowledge the statement we made has never been contradicted.

We are completely at a loss to understand what Mr. Hyde means when he refers to the fact that after acetification there is still sufficient food for 100 times the repetition of the oxidation. If he will consider the original wort, after alcoholic fermentation, or the wash, he will notice that it contains about 6·5 per cent. of alcohol, whereas the final vinegar contains only 0·2 to 0·5 per cent. As the total solids vary from 1·7 to 2·5 per cent., this is obviously not sufficient food for 100 times the original oxidation, which, it must be admitted, takes place chiefly at the expense of the alcohol.

We do not agree that vinegar is normally saturated with carbon dioxide at N.T.P.; the fermented wort may be, but much of this is lost during subsequent acetification. In any case, beers and mineral waters are rather more than saturated at N.T.P.

With regard to Mr. Hyde's final paragraph, we should like him to consider the derivation of the word vinegar, or vinaigre. This means sour wine. In German this is called Weinessig, or acetous wine; while Malz- or Bieressig refers to malt vinegar. In English-speaking countries, therefore, it is not only the acetic acid diluter who has misappropriated a word, and we do not think that Mr. Hyde should be so hard on the Ministry of Health in consequence. In our opening paragraphs we did our best to encourage the attitude that in our opinion acetified vinegar is the best. In our concluding paragraph we endeavoured to draw the attention of vinegar brewers to a state of affairs for which they themselves are partially responsible. We cannot agree that dilute acetic acid is necessarily a dilute poison, without thinking that all vinegar is this—and we do not—but we would urge Mr. Hyde to collaborate with us in our attempt to popularise and encourage a liquor which has, by its very process of production, a superior aroma and flavour to dilute acetic acid.

Yours faithfully,
W. WARREN.
T. MCLACHLAN.

SELLING SAMPLES

An Exhibition Visitor's Impressions

To the Editor.

DEAR SIR,

May I be permitted to occupy part of your valuable space in recording my reflections following on a visit to the Nations Food Exhibition to which I went recently, hoping to find some novel and interesting features and, generally, as one who is a trade observer, if not a buyer.

Once beyond the first row of stalls and the battle began. Thence onward one's progress was determined by the necessity of avoiding over-eager salesmen, or more often saleswomen, who pressed one to buy samples of every kind and description of foodstuff, in which one was frequently quite uninterested and in every case unwilling to carry, and who seemed unable to answer intelligent questions about the nature, production, or packing of the goods they so assiduously peddled. It was worse than Berwick Street on a fine afternoon!

There were, of course, one or two honourable exceptions, and one is loath to speak ill of many first-class firms with excellent exhibits, who treated one intelligently and gave one the information asked for efficiently and courteously. But such is the nature of man that this excellent impression was submerged and overwhelmed in the frenzied escape from the crowds of importunate sample sellers.

Surely exhibition organisers can do something about this. It is fair and reasonable to sell samples to members of the public who enquire at certain stands, and nobody denies the value of samples for advertising purposes. But there should be a limit to the powers of pursuit—or it should be enforced if one already exists—and exhibitors themselves should realise that a sample unwillingly accepted or, even more so, unwillingly paid for, is definitely disadvantageous to them, as it creates a feeling in the recipient that will translate itself on the next appearance of the goods into a violent desire to flee as far and as fast as possible.

Yours faithfully,
L. F. E.

Doctors in Candy Making

"DOCTOR as the Chemist Sees It," is the heading to the second chapter of what is without doubt still the most comprehensive American book on the manufacture of sugar confectionery—namely, *The How and Why of Candy Making*, by Matthew Berman, and published by Emmet Boyles, Chicago, 1925. Mr. Clifford Clay, one of the three authors mentioned as being included under the *nom de plume* "Matthew Berman," is well known here as an authority on confectionery.

The importance of "doctors" in manufacturing confectionery is fully appreciated and receives the attention which the subject deserves. "Perhaps the most important part of candy making on which success or failure usually depends is the doctoring of the batch. This technical slang term designates the process of preventing or retarding the graining of the batch by uncrystallisable substances, either produced in the batch itself or added in predetermined amounts. . . . The doctors in common usage are corn syrup, cream of tartar, invert sugar (Nulomoline), citric acid, acetic acid, tartaric acid, and yeast, in order of popularity."

The oldest procedure of cutting the grain is by the "water-killed" batch, involving prolonged boiling with repeated renewals of the water. Here, inversion is due to the fact that traces of organic impurities adhering to the sugar crystals are caramelised, and thereby produce an initial acidity, which gradually increases with boiling.

Acid doctoring (or "acid-killing") to produce inversion is a very delicate, unsafe process, which is difficult to control, because of several factors—such as time, temperature, amount of acid and mineral matter—which tend to produce varying results. The inverting power of acids is greatly weakened by the presence of traces of mineral matter. Cream of tartar owes its mild inverting action to the fact that the strong action of the acid is checked by the potash radicle.

Glucose (corn syrup) recommends itself because of its cheapness, its ready-prepared form, and the ease of using it in exactly predetermined amounts, leading to simplicity of operation and certainty of results. Much the same advantages attend the use of invert sugar.

With these introductory remarks amplified, together with a discussion of fundamental facts in candy making, Berman's book proceeds to give useful practical advice on the use of doctors, cookers, water, and the question of formulas. "The modern factory has little room for chance and luck." Then for the rest of the 480 pages the author exemplifies this text by describing the production of sugar confectionery from the rational, business viewpoint. There are, of course, indications that the book is an American production, particularly when the author is referring to ingredients in formulæ. For instance, referring to gum drops, "Matthew Berman" speaks of a "Hudson River crystal thin boiling starch"—a name which quite a few English confectionery makers might be puzzled to translate. This is a minor point, however; there is really very little in the book that any intelligent individual would find hard to Anglicise, and nothing that would not be worth the effort when he had done so.

TRADE NOTES

Chocolate and Confectionery Manufacture.

The latest of a series of practical booklets issued by Messrs. A. Boake, Roberts and Co., Ltd., to the trade is *A Handbook on Chocolate and Confectionery*. Into its 80 pages is packed a great deal of information useful to those engaged in the chocolate and sugar confectionery manufacturing industries. We congratulate Messrs. A. Boake, Roberts and Co., as we have done on previous occasions, on the good sense and progressive spirit they have shown in passing on to the trade the results of their extensive experience. The free disposal of technical service of this nature is bound to bear fruit, and it is a practice which appears to be more common in America than over here—unfortunately for everybody.

Briefly stated, the handbook deals with the manufacture of cocoa, chocolate, and sugar confectionery in most of its aspects. Owing to the concise nature of the text all the main points of practical significance receive attention, and there is, here and there, a little theory also which serves to throw light on the reasons why certain things happen under certain conditions. The matter is well arranged, and we feel sure that others will profit, as we have done, by devoting a couple of hours or so to a careful study of the contents of this booklet.

* * *

The Birmingham Show.

If the support received from all branches of the canning and fruit industries is any criterion, then the Imperial Fruit Show and Canners' Exhibition to be held at the Bingley Hall, Birmingham, from October 21 to 29, is already an assured success. Sales of space for trade exhibits are already in excess of last year's total, which was a record up to date. In point of fact, every foot of available space has now been disposed of. Stands have been taken by leading firms in practically every section of the two industries—including fruit merchants and salesmen, nurserymen, insecticide manufacturers, horticultural machinery and sundries manufacturers, box makers, canners and canning machinery manufacturers.

An important concession has been granted by the railway companies in connection with travelling facilities to and from Birmingham during the show period. From stations within 60 miles of Birmingham return tickets will be issued at single fare for the double journey. From stations outside the 60-mile radius, return tickets will be issued at fare and a third for the double journey from all parts of the country, available from the day before the opening to the day after the closing of the show. Such tickets will be issued in exchange for a voucher signed by the secretary.

A strong Birmingham Committee has been formed to advise the London General Committee on all local matters affecting the general organisation.

* * *

Royal Visit to Can Factory.

The works of Messrs. J. W. Feaver and Co., Ltd., the well-known London specialists in cans for meat, chicken, jams, fish, and cheese packing, received a surprise visit some weeks ago from H.R.H. Prince George, who arrived at the Tower Bridge Road factory quite unexpectedly with a factory inspector, and was conducted round the entire works by Mr. J. W. Feaver, who, with Mr. F. W. Williams, is joint managing director of the firm. During his tour of an hour and a half the Prince also visited the extensive departments devoted to the production of decorated tin canisters, and watched the production of cans for ham packing, concluding his visit with an inspection of the workers' canteen.

* * *

Messrs. Jackson and Crockatt, Ltd., in connection with our note on macaroni manufacture, inform us that they have produced a new type of machine which can successfully packet macaroni.

* * *

A Correction.

By an unfortunate printer's error, the notes in small type at the foot of p. 235 of Messrs. Baier and Stevens' article on lemon juice in our last issue were transposed in order. The note marked with an asterisk at the foot of the column actually referred to the score of the samples which was marked thus † in the table, while the title keyed with an asterisk actually referred to the footnote marked †, and the third note marked ‡ was given in explanation of the reference to U.S.A. mayonnaise standards. Opportunity may also be taken of this note to add the title to Fig. 1, which was omitted at the time; this should have read: "Diagram illustrating the effect of the addition of citric acid to tomato juice."

* * *

A correspondent informs us that Mr. Goodwin Tidswell and his son, Mr. Charles G. Tidswell, of the firm Tidswell, Bailey and Tidswell, Ltd., Manchester, have disposed of their holdings in Quality Products, Ltd., of Hyde, Cheshire, and are no longer interested in that firm financially or as directors.

Messrs. Tidswell, Bailey and Tidswell, Ltd., have retained their distributing agency of the "Blue Cow Nucreem" machine, the product of Messrs. Quality Products, Ltd.

* * *

Classes for Canners and Box Makers.

A large number of classes for English and Empire canners and manufacturers of non-returnable packages for the fruit and canning industries is included in the Imperial Fruit Show schedule, a copy of which may be obtained from the Secretary, 5, Bloomsbury Square, London, W.C. 1. English entries in the canning section are to be drawn from stocks at the cannery or on the market by representatives of the Campden Research Station. This arrangement has been put into force in order to prevent special packing for show purposes, and to put before the public a representative display of English canned fruit of variety and quality as on the market.

Classes for non-returnable packages include one for the best entry of such a package suitable for marketing twenty-four 2½-size or forty-eight 1-size cans. There is also a class for the best can opener of British manufacture suitable for use in the home.

* * *

The Levant Fair.

This year, as regularly since 1930, an international sample fair will be held at Bari, Italy, from September 6 to 21, under the name of the Levant Fair, for the purpose of exhibiting all Italian and foreign products and manufactures suitable to meet the requirements of the Balkan, African, and Asiatic countries, as well as the typical products exported from such countries.

Owing to the geographical position of Italy, and of the port of Bari in particular, the Levant Fair is a most suitable and convenient meeting-place for business men of the Western and Eastern markets, while its whole organization is said to be carried out on strictly practical lines.

The Levant Fair also offers the services of an *Ufficio Scambi*, which, in addition to promoting events of various kinds in the course of each show, gives the fullest possible assistance to exhibitors, free of charge, for a whole year—all to the end of enabling participating firms to negotiate and transact purchases and sales, or to arrange agencies or other business connections.

Travelling expenses both ways will be refunded wholly or in part to buyers from abroad who place orders with exhibitors for an amount stated in the special regulations.

Groceries of the Empire.

The Empire Marketing Board is again an exhibitor in the annual Bakers' and Grocers' Exhibitions which take place this month in the Royal Agricultural Hall, Islington.

In the Bakers' and Confectioners' Exhibition, which lasts from September 3 to 9, England and Wales, Northern Ireland, Canada, Australia, New Zealand, South Africa, India, and the Irish Free State will have individual displays in the Empire Marketing Board section.

In the International Grocers' Exhibition, which opens a fortnight later, the exhibitors will be England and Wales, Scotland, Northern Ireland, Canada, Australia, New Zealand, South Africa, India, Irish Free State, Southern Rhodesia, Malaya, and Trinidad and Tobago.

The Empire Marketing Board section in both exhibitions will be open to the public, and samples of Empire products will be on sale.

* * *

Tax on Canned Pineapple.

In order to provide funds for the encouragement of pineapple growing and canning in French Colonial Possessions, a law was presented to Parliament and received the Presidential signature on April 28, 1932, being published in the *Journal Officiel* of April 29, 1932, according to information received from the office of the American Consul at Paris, France. Under the provisions of this law, the following special import taxes are imposed on canned pineapple:

Tariff No. Ex86.	*Francs per Kilogram.*	*Cents per Lb.*
Pineapple, preserved in the natural state, whole or otherwise, in a sugared liquid not containing alcohol	0·30	0·54
Pineapple, in a liquid containing neither sugar, syrup, nor alcohol	0·15	0·27

The proceeds of the above tax will be distributed among the French colonies, protectorates, and territories under French mandate in accordance with the provisions of a Ministerial Decree to be issued later.

* * *

Seamless Steel Confectionery Utensils.

To demonstrate the quality of British made tinned steel seamless articles at prices competitive with imported manufactures, Messrs T. F. and J. H. Braime, Ltd., are exhibiting at the Chocolate and Confectionery Exhibition at Olympia a representative display of seamless utensils. These products will also be found on several stands at the Confectioners', Bakers', and Allied Traders' International Exhibition and Market which is being held at the Agricultural Hall, several of the leading British makers of mixing machines having adopted the firm's pressed seamless bowl.

The exhibits will consist of a large range of pressed steel pans, trays, moulds, buckets, bowls, and bins, both for the handling and storage of foodstuffs in course of manufacture. Also a special display will be made of seamless bowls suitable for mixing machines.

* * *

The Fishing Industry of Russia.

Before the war the fishing industry in Russia employed about 500,000 workers, but technically it was very backward, according to information contained in *Sowjetwirtschaft u. Aussenhandel*, May 10, 1932. As a result, production was low, considering the abundant supplies of fish available, the catch in 1913 amounting to only 974,820 short tons. The Five-Year Plan of the Soviet Government provided for the technical improvement of methods of catching and handling fish, and the results of the first three years show decided improvement. Production in 1930 and 1931 was as follows:

	Short Tons. 1930.	1931.
Volga-Caspian District	511,467	500,246
Far Eastern District	351,160	349,175
Azov and Black Sea District	116,116	144,754
Northern District	82,308	150,078
Azerbaidzhan District	61,233	89,187
Dagestan District	81,206	68,982
Ukranian District	44,180	55,864
Aral Sea District	44,621	51,389
Ural District ...	33,863	40,652
Turkman District	12,092	12,798
Arctic Ocean District	176	1,080
All others	75,055	110,880
Total	1,413,477	1,575,085

The fishing industry is in the hands of the State, which operates in three ways—through fisheries managed directly by the State, through those managed by fish co-operatives, and through collectives which include a constantly increasing number of individual fishermen. The share of the latter groups in the total production of fish is large and growing, having been 60 per cent. in 1930 and 88 per cent in 1931. Collectivisation of fishing has brought many changes and improvements, such as use of power boats, motorised fishing stations, and better boats, gear, etc. The engine power available for fishing rose from 28,000 h.p. on January 1, 1929, to 150,000 h.p. on January 1, 1932. The number of boats in use also increased from 67,100 in 1930 to 78,800 in 1931.

The distance of most of the fisheries from the consuming markets prevents shipments of large quantities in fresh condition. The table below shows the quantities shipped in various forms in the last two years:

	Short Tons. 1930.	1931.
Frozen	114,639	181,769
Salted	717,868	756,508
Smoked	18,739	21,988
Dried	28,889	29,854
Canned	26,896	30,158
Oil	3,307	3,780
Fishmeal and fertiliser	1,102	4,878
Fresh	104,828	173,171
Total	1,016,268	1,202,106

Improvements in transportation and preparation are making it possible to increase constantly the proportion of fresh fish shipped to market.

Fish canning is also making great strides and facilities are constantly being enlarged. Production of canned fish, in cans of 400 grams net, amounted to 56,262,000 in 1930 and 74,297,600 in 1931. Canning methods are being improved, with increasing recovery and utilisation of by-products, such as oils, fish-meals, etc.

For the improvement of the technique of fish and preparation of fish as a food and for other purposes, the Soviet Government has set up a number of scientific institutes and experiment stations, located at the chief points of catch and production, and supervised by a central scientific organisation, the Tsirkh (Central Scientific Institute for the Fish Industry). The tasks of this institute include investigation of different districts, study of kinds of fish in each, migration and other habits, etc.

* * *

Package Tax Modified.

By a resolution of the Irish Free Dail, dated June 2, the package tax is made applicable to all imported food (whether for consumption by human beings, animals, or birds), except for a certain number of items, among which is meat and meat paste in sealed bottles, jars, tins, or cans.

IMPORTANT ARTICLES

will be published in the next issue of FOOD MANUFACTURE on **Canning** and **Preserving.**

Special attention is drawn to two articles by prominent American authorities, one on **The Production of Vacuum in Canned Foods,** and the other on **Tomato Canning and Tomato Products.**

INFORMATION and ADVICE

USE OF EGGS—MACARONI—SPOILAGE OF CORN STARCH—SAUSAGE DISCOLORATION—FROZEN FISH—CRYSTALLISED DEXTROSE—LARD HARDENING—MAYONNAISE STANDARD—PINEAPPLE VINEGAR—BLEACHING BEESWAX—ENZYMES—BOTULISM—"SYNTHETIC" ALBUMEN

Use of Eggs.

792. *We wish to make profitable use of a surplus of eggs. Kindly give suggestions.* (Yorkshire.)

We gave a note on this in reply to Enquiry No. 772 in the August issue, but this may be supplemented by a report which has just been received concerning the opening of an egg powder business by the Walter W. Esdon Company of Saskatoon, Sask., which involves the collection of eggs for the factory over a wide area of Northern Saskatchewan. The factory is reported to be using 7,000 dozen eggs per day. In addition to egg powder, a product of the yolks of eggs used principally by biscuit manufacturers, the plant is producing frozen albumen, or white of egg, for the baking trade, and it is the intention to start soon on the production of spray hen egg yolk, which is in demand for the manufacture of ice-cream. Later it is intended to instal an albumen dryer to convert the white of eggs into albumen powder used by the confectionery trade and in the manufacture of bakers' specialities.

Macaroni.

793. *As regular subscribers to your journal we noted with interest your recent article on the question of the manufacture in this country of macaroni. This is a matter we have had under consideration for some considerable time, and we shall be very much obliged if you can furnish us with any information on the subject, together with the names of suppliers of the necessary machinery.* (London.)

So far as we know, there are no firms in this country that build machinery specially for macaroni making, although there is a firm producing a packing machine for the purpose. Macaroni machinery is built in Italy, and the names and addresses can be supplied if required. Reference should be made to the May issue for a short description of the plant and process.

794. *Please put us in direct communication with one or two large importers of tea.* (Wales.)

This was done.

795. *Can you let us have the names and addresses of manufacturers of Christmas pudding basins?* (Plymouth.)

Suggestions were made.

796. *We shall be much obliged if you can send us the names and addresses of firms who are manufacturers of autoclaves and plant for the production of mayonnaise sauce.* (Yorkshire.)

This was done.

797. *We should be glad to have the information given in answer to Enquiry No. 763 regarding the makers of plant for the manufacture of coffee essence.* (Scotland.)

This was furnished.

798. *Will you kindly favour us with a list of names of the makers of machines for the manufacture of toasted wheat flakes, etc.?* (Glasgow.)

Suggestions were made.

Spoilage of Corn Starch.

799. *Could you give us some information regarding the various precautions which must be taken to prevent products like corn starch and custard powder from being contaminated with mould, etc., before and during mechanical packaging? Are they sterilised?* (Holland.)

We have never heard of corn starch or custard powder being heat sterilised before packing. We should imagine that the most one could do in this respect is to see that these powders before packing are not stored in a damp atmosphere and that they are kept reasonably dry and stored in air-tight containers, so as to minimise the chance of being infected by mould spores, etc.

Of course, the powder must not be filled into the packages in a damp condition, otherwise they do not run freely, and also there is greater danger of contamination.

The other remarks you make about maintaining hygienic conditions in the factory are important, and if arrangements can be made for circulating clean air of the right degree of humidity in the packing room, so much the better.

So much depends on circumstances. In most cases one probably cannot go to the expense of installing plant for conditioning the air. A compromise is to be found in maintaining hygienic conditions and seeing that the storage is done in a dry, clean place, and that the powders are not allowed to become damp.

The same applies to cartons. Here it is really a question of seeing that they are stored under hygienic conditions and not allowed to get damp, otherwise, of course, mould growth would be induced.

800 *Kindly inform us of the firms supplying fruit pulping machines, and also tins and bottles.* (Lancashire.)

This was done.

801. *Please supply names of firms able to furnish mechanical exhaust plant suitable for metal cap fruit bottles, etc.* (Lincolnshire.)

This was done.

802. *I shall be pleased if you will give me a list of reference works on jam manufacture.* (Yorkshire.)

There is no book published dealing with modern factory operations and layout. We suggest you consult back numbers of FOOD MANUFACTURE, especially the May, 1932, issue.

Sausage Discoloration.

803. *As subscribers to your journal we should be glad if you could help us with the following query:*

We have recently commenced to manufacture pork sausage, and we find that after the first day our product loses its bright colour and becomes dull and brown.

We should be glad if you could let us know if there is any method of treating the casings or filling which will prevent this discoloration, which occurs twenty-four hours after filling. (Lancashire.)

The loss of colour of pork sausages cannot be overcome by treating the casings or by any special method of filling. One very important point that must be realised in connection with the bright appearance of sausages is that as fresh pork meat as possible must be used. Secondly, that there must be a fair proportion of fat to the lean. Thirdly, no saltpetre should be used for fresh pork sausage, as it will give a pickled appearance to the meat.

The browning that you are experiencing is probably due to the excessive drying of the sausage casing. This warm weather is a constant source of trouble to sausage manufacturers. We are not suggesting for one moment that you should go to the other extreme of keeping the sausages wet, but we do advise that the sausages be kept in a cool storage place. Immediately after sausages are filled into casings (the casings should be wet at the time of filling), they are hung up in a cool temperature in order to dry off the superfluous moisture on the exterior of the casing. When the sausages are sufficiently dry, they are packed and placed in cool storage until ready for despatch.

804. *Early in the year* 1929 *a company was floated in London for the purpose of delivering farm produce direct to the public. I think it was called the Direct Produce Delivery Co., Ltd. I would like to know if this company still exists.* (Peru.)

The only firm with a similar name that we have been able to trace is the Direct Produce and Supply Co.

805. *Could you tell me where I could obtain transparent wrapping similar to the sample submitted?* (Notts.)

Suggestions were made.

Frozen Fish.

806. *I understand that a new process has been found out in England for the preparation of fillets of fish, which can be kept quite fresh for a certain time. As far as I know, the container used for the packing is strong enough to allow the transport to be made without special care being taken. As I am very interested by this matter, I should be much obliged to you to let me know whether you have published some interesting articles on that subject in one or more issues of your journal.* (France.)

We have from time to time published notes recording the progress made in U.S.A., where a large amount of literature has appeared during the past few years. Probably the most recent and up-to-date account (illustrated) of one process in operation is given by Harden F. Taylor, of the Atlantic Coast Fisheries Company (see *Ind. Eng. Chem.*, June, 1932, p. 679).

Fish, being cold blooded, ordinary forms of preserving in ice are inadequate. The digestive enzymes in the metabolic system are very active at low temperatures, and, if due precautions are not taken, will quickly act on the dead tissues, while fish oils, being highly unsaturated, are liable to oxidation. Hence, as pointed out by Mr. Taylor, some effective means of preservation have to be taken as soon after being caught as possible. Within recent years, considerable change has been effected in the method of preserving fish, which has resulted in the following procedure: The fish are gutted on board, and subjected to machine washing in such a way that continuous fresh sea water is used for each fish. Storage is done on shelves in ice, to prevent bruising by excessive pressure, as would be the case if stowed in deep bins.

On arrival at the works, the fish is hand filleted and machine skinned by passing to a machine consisting of two revolving cylinders, one at $-24°$ C. and the other at 20° C., round which passes a thin metal belt. The fillets are frozen on to the thin metal band as it comes into contact with the colder roller, while an oscillating knife removes the skins, which are picked up automatically. In contact with the warmer roller, the skinned fillets thaw and fall into a receiver. The next process is brining to maintain the character of the colloid proteins. The fillets are worked through this brine bath at a regulated speed and time, and carried forward to the machine which cuts them into steaks. They leave this machine, which cuts 85 steaks per minute, bound with vegetable parchment paper, and are conveyed to the freezing machine, where they are frozen at $-5°$ C. in about 35 minutes. After that they are packed by an automatic carton filling machine.

807. *Kindly give names and addresses of makers of machinery for flaking, shredding, and puffing rice, wheat, etc.* (London.)

This was done.

808. *Please furnish names of makers of onion peeling machines.* (Yorkshire.)

These were supplied.

809. *With reference to your reply to Enquiry No. 678 in the June issue, we should be much obliged if you could give us the name of the maker of the "Flakice" machine.* (India.)

This is not known to us, but a probable American source of the information was suggested.

810. *I am very desirous of getting in touch with an engineering firm who make plant for the manufacture of fruit juice into crystal form, including the necessary juice extractor.* (Bristol.)

Suggestions were made.

811. *Will you kindly put us in touch with suppliers of vinegar bottles?* (Wales.)

This was done.

Crystallised Dextrose.

812. *Under your "Information and Advice" column on p.* 185 *of* FOOD MANUFACTURE *for June you make the following remark concerning Coproco:*

"It will hold up to a surprising extent without crystallisation in a supersaturated condition. There are, of course, several ways of overcoming these difficulties."

We shall be glad to have any information you can give us on getting dextrose to crystallise in fine crystals. (Yorkshire.)

This sugar is prone to delayed crystallisation and will hold up in supersaturated solution to a surprising extent, and then crystallise out in hard "nodules." We understand (without having had actual experience in the matter) that crystallisation in fine needles may be induced by "seeding out"—*i.e.*, by inoculation—beginning with a small quantity in the laboratory and proceeding to larger and larger amounts.

Fine crystallisation may also be induced by mechanical agitation.

These suggestions should be verified by placing your enquiry before the technical department of Corn Products, Ltd.

813. *As an annual subscriber to your journal, I would very much appreciate any technical advice you could furnish me with in connection with the manufacture of icing sugar. I have a small plant operating, and the information I desire is in regard to the most suitable grades of sugar for the production of satisfactory icing sugar. Naturally I wish to use the most economical class of sugar, and I would be glad to know if beet sugars produce a satisfactory icing and piping sugar. Are there any particular "snags" to avoid?* (Ireland.)

The best thing to use is a crystal similar to Tate's T.L.S. Fine for the production of icing sugar. Beet sugars produce a good icing, but the colour is never quite so good as a cane, but we understand that a certain number of people mix cane and beet.

There are no real snags in the production of icing sugar provided the sugar is dry and care is taken to keep the silks in the sifter clear.

The enquirer was referred to an authority for more information if required.

Lard Hardening.

814. *We refine lard, but our trouble is that we are unable to make it firm during the hot weather, as it remains soft and oily. Could we trouble you for information on this point?* (Ireland.)

In the United States soft lard, particularly for export to warm climates, is stiffened by the incorporation of lard stearine. A similar practice is adopted, although we believe there is in some states a ruling about the amount of lard stearine added, with regard to soft lard derived from "soft and oily" hogs produced chiefly in the South on feeds such as pea nuts and soya beans. Such stiffened lard is known in America as "Cuba lard."

It is also possible to use beef (oleo) stearine.

Of course, the nature of the feed, as you will probably already know, has a considerable effect on the consistency of

the lard. Another factor which influences the consistency is the rate of chilling. Quick chilling enables the lard to withstand a higher temperature without softening than if it were slowly chilled. The choice of fats is also another factor which has an influence on the hardness. Thus some of the "cutting" fats melt at as low a temperature as 36° C., while the leaf fat, which is classed as "killing" fat, does not melt until 41° C. A lard refiner usually makes a judicious selection of the various fats, mixing the hard "killing" lard with the softer "cutting" lard to produce a lard of the desired hardness.

If a lard roll is not used there is danger of the oil and stearine in the lard separating out in the package, in the case of packaged lard.

815. *We would be glad to have recipes for "health salts."* (London.)

A selection was supplied.

816. *We are needing a large grinding machine and also a large meat cutting machine. We would be pleased if you could give us names of any firm or firms that could supply these. We want them in large size and thoroughly up to date.* (Lincs.)

Names of suppliers were given.

817. *Kindly suggest names of firms able to supply a pan suitable for the boiling of sauces, pickles, etc.* (London.)

This was done.

Mayonnaise Standard.

818. *With reference to the excellent article by Baier and Stevens on "Lemon Juice in Foodstuffs," published in your last issue, we note that mention is made of the U.S.A. standard for mayonnaise. We would like to have some particulars of this standard.* (London.)

This standard, which was approved by the Secretary of Agriculture, U.S. Department of Agriculture, on November 10, 1931, is as follows:

"Mayonnaise, mayonnaise dressing, mayonnaise salad dressing, is the semi-solid emulsion of edible vegetable oil, egg yolk, or whole egg, a vinegar, and/or lemon juice, with one or more of the following: salt, other seasoning commonly used in its preparation, sugar, and/or dextrose. The finished product contains not less than 50 per cent. of edible vegetable oil."

Thinking you might be interested in comparing the above new standard with the old standard, we quote below the standard approved in 1929:

"Mayonnaise, mayonnaise dressing, mayonnaise salad dressing, is the clean, sound semi-solid emulsion of edible vegetable oil and egg yolk or whole egg, with vinegar and/or lemon juice, and with one or more of the following: salt, spice, sugar. The finished product contains not less than 50 per cent. of edible vegetable oil, and the sum of the percentages of oil and egg yolk is not less than 78."

819. *We wish to obtain information on the causes of cracking and liquid separation in lemon curd.* (Lancashire.)

We would refer you to back numbers of FOOD MANUFACTURE for several references to these difficulties, particularly the May and August, 1931, issues.

820. *Can you put me in touch with an English firm manufacturing a labelling machine for glass jars?* (Canada.)

Names of firms were given.

821. *Kindly indicate where we can obtain supplies of acetic acid.* (Wales.)

This was done.

822. *Please let us have the names of firms making machines for peeling pickling onions.* (New Zealand.)

These were supplied.

823. *In your July number we notice that one of your clients is manufacturing a regular but small quantity of bacon and ham fat. This appears under Enquiry No. 728. As we are regular buyers of this material, we should feel obliged if you would kindly put our name before your friends.* (Liverpool.)

This was done.

824. *Required, names of firms in U.K. supplying ground cocoa.* (London.)

These were furnished.

825. *We shall be glad if you will put us in touch with Enquirer No. 728. We are lard refiners and buyers of the class of fat your enquirer mentions.* (Barrhead.)

This was done.

826. *Can you give me some particulars of the manufacture of bloater paste?* (London.)

See the article on the preparation of fish pastes in the June, 1932, issue.

827. *Please supply information on the stiffening of lard from bacon fat.* (Wales.)

See answer to Enquiry No. 814.

Pineapple Vinegar.

828. *We would be pleased if you could give us some methods for making vinegar out of pineapple juice.* (India.)

There are several recipes for this, and the following is one of them:

80 lb. of grated pineapple (or pineapple juice).
80 lb. of white sugar.
2 gal. of 24 grain pale vinegar.
½ drachm of saffron.

Squeeze the juice out of the pineapple in a press and run it into a boiling pan. Add sugar and bring to the boil. Place the saffron in a pint of water and bring to the boil. Then add this to the sugar and juice and bring to the boil again. Allow to stand for about five minutes; then skim. Now add the vinegar and pass the whole through a filter bag until bright, after which bottle (over 180° F.) and cork or cap. This product will keep well if stored in a cool place.

829. *Kindly supply directions for the preparation of meat and fish pastes.* (London.)

See articles in the May and June issues.

830. *Can you put us in touch with any firms able to supply machines for skinning and splitting locust bean pips?* (London.)

Suggestions were made.

831. *Please refer us to manufacturers of small plant for packing pork sausages in tins.* (Oxon.)

This was done.

832. *We send you under separate cover a sample bottle and cap, and would be much obliged if you could let us know where we can obtain supplies of similar bottles and caps.* (Wales.)

Suggestions were made.

833. *Directions required for making up standard solutions of soda and potash for titration.* (London.)

These were given.

834. *Please telegraph name of a British manufacturer of vegetable dicing machines.* (Scotland.)

This was done.

Bleaching Beeswax.

835. *Can you give me particulars of an inexpensive method of bleaching beeswax?* (Australia.)

In general there are two ways of doing this; one is by a natural method by exposure to sunlight, and the other is by a chemical method involving the use of bleaching agents. No doubt the natural method is the better of the two, but it takes much longer. The drawback in chemical bleaching is that it produces a crystalline structure in the beeswax.

Such impurities as may be present can be first removed by melting the beeswax and boiling it with a small addition of dilute sulphuric acid, say in the proportion of approximately 1 part by weight of acid to 1,000 parts of wax. The clear wax thus obtained is run through a sieve and quickly cooled. One way of doing this is to run the wax on to a rotating drum half immersed in cold water, when the wax forms thin ribbons, which are readily removed from the drum and after-

wards spread out and exposed to air and light. By this means the wax is finally bleached.

The next step is to re-melt the wax and again cast off into ribbons and repeat the exposure to air and light. These operations may occupy a period of several weeks, depending on the weather and the nature of the wax.

The other method of bleaching is to boil the wax with a weak solution of potassium bichromate acidulated with sulphuric acid. The product is then boiled with a solution of oxalic acid in order to remove the colour produced by the potassium bichromate. Other agents which are being used for chemically bleaching beeswax are nitric acid, hydrogen peroxide, and sodium hypochiorite.

836. *Can you put us in touch with anyone who might happen to have a currant strigging machine, either new or second-hand, ready for prompt delivery?* (Lincs.)

Suggestions were made.

837. *We are interested in fibre and paper cans, but do not know who are the makers of these. We shall be greatly obliged if you will supply us with suitable names of firms.* (Surrey.)

This was done.

Enzymes.

838. *Required, prices, suppliers, and methods of use of proteolytic enzymes as used in pectin manufacture.* (New Zealand.)

For the action and uses of proteolytic enzymes in connection with the manufacture of pectin, we believe your best plan would be to refer to page 140 of the May issue, where a short article was given on the manufacture of pectin, referring to the use of enzymes in this connection.

There are several trade "brands" of enzymes used for the purpose, and "Clarase" is one which is marketed in this country.

Botulism.

839. *Is there any danger of botulism from string beans preserved cold, after slicing, in layers with salt?* (New Zealand.)

It is, of course, impossible for us to give a direct answer to this question.

In general, one can state that *B. botulinus* is widely distributed in nature, especially in the surface layer of soi.s, and thus may gain access to fruit and vegetables. It is stated .hat it is only capable of producing the dangerous toxin when grown under circumstances which ensure the absence of oxygen, and this form of poisoning is peculiar to canned and glass packed preparations.

Another point is that the presence of salt in the food lowers the thermal resistance of the organism, and this resistance decreases with increasing concentration of the salt.

All things considered, therefore (we are speaking in very general terms), it would appear that by packing the preparation in the presence of air and high concentration of salt, conditions are produced which are unfavourable for the existence of the toxin-producing *B. botulinus*.

840. *I should be much obliged if you could give me information on the baking of Swedish crisp bread.* (Japan.)

We know of experiments that have been made which did not give results of much value. Apparently the meal should be coarsely ground on stones and a very tight dough is desirable. Some general information on rye bread is given on another page.

841. *Could a drying plant, formerly used for sand-lime bricks by the dry steam process, be employed for drying vegetables?* (South Africa.)

We do not think such a plant would be suitable. See the article on dried vegetables in the next issue.

842. *Can you inform me where I can purchase a grindstone similar to the illustration supplied?* (Scotland.)

Names of firms were given.

"Synthetic" Albumen.

843. *I am at present interested in certain substitutes for the whites or albumen of eggs. Can you give me particulars as to a product called "Alcena" or Synthetic Albumen, also a formula for use of this substance? Also can you give me any information concerning a root used in Egypt, similar to a sweet potato, which is made into a solution for use instead of the whites of eggs?* (Australia.)

We have no information concerning a root used in Egypt for preparation of a substitute for egg albumen. Possibly one of our readers may have come across this; if so, we should be glad to hear about it.

Names and addresses were given of the suppliers of "Alcena" and synthetic albumen, who were requested to furnish full particulars.

New Companies

EDMUND LUND, LIMITED. (267498.) 3, Mitchell Street, Keighley. To carry on the bus. of confectioners, etc. Nom. Cap.: £2,000 in £1 shares.

IDEAL PRODUCTS (SOUTH WALES) COMPANY, LIMITED. (267508.) Windsor Factory, Duffryn Road, Port Talbot. To carry on the bus. of mnfrs. of and dlrs. in potato crisps, patented foods, etc. Nom. Cap.: £500 in £1 shares.

LETCHWORTH PURE FOOD COMPANY, LIMITED. (267511.) Glebe Road, Letchworth, Herts. To carry on the bus. of mnfrs. of infants' and invalids' foods, etc. Nom. Cap.: £100 in 1s. shares.

BOWERS AND HEPWORTH, LIMITED. (267196.) To take over businesses of mnfg. confectioners and genl. dlrs. cd. on by R. E. Bowers at Brunswick St., Pendleton, Salford, and by W. L. Hepworth at 7, Leaf Square, Pendleton. Nom. Cap.: £3,000 in £1 shares.

SIDNEY VAN DEN BERGH, LIMITED. (267190.) To carry on the bus. of bacon and ham curers, genl. provision mchts., etc. Nom. Cap.: £10,000 in £1 shares.

ENTERPRISE FISH COMPANY, LIMITED. (267471.) Victoria Chambers, Surtees Street, Fish Docks, Grimsby. To carry on the bus. of fish mchts., etc. Nom. Cap.: £1,000 in £1 shares.

STRATFORD-ON-AVON PRODUCE CANNERS, LIMITED. (267064.) 46, Cherry Street, Birmingham. To carry on the bus. of canners of fruits and vegetables, etc. Nom. Cap.: £2,500 in £1 shares.

H. J. PROBYN AND COMPANY, LIMITED. (267313.) The Grove, Banham, Norfolk. To take over the bus. of a fruit and vegetable canner cd. on at Banham. Nom. Cap.: £5,000 in £1 shares.

N. C. J. FLOWER, LIMITED. (267013.) To take over the bus. of a mnfg. confectioner cd. on by N. C. J. Flower at 30a, Bowles Rd., Camberwell. Nom. Cap.: £2,000 in £1 shares.

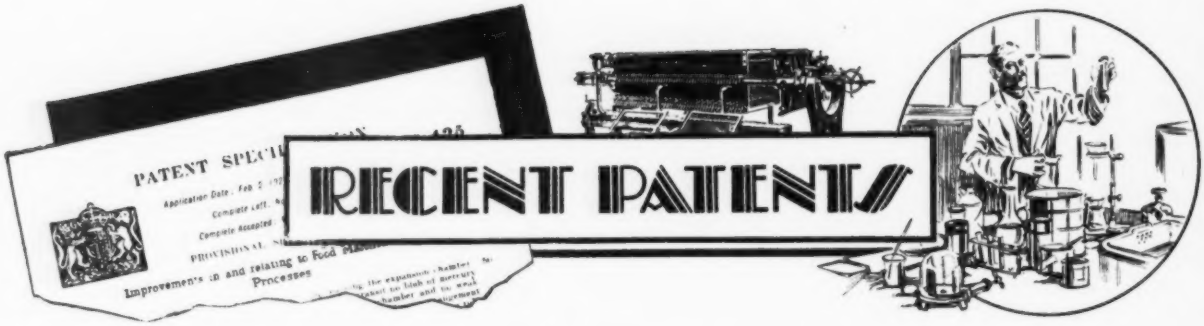
GLISTEN COMPANY, LIMITED. (267121.) To carry on the bus. of bakers' and confectioners' sundriesmen, etc. Nom. Cap.: £500 in £1 shares.

HORROCKS BAKERY, LIMITED. (267627.) To take over the bus. of a baker, etc., cd. on at Goodier St., Newton Heath, Manchester. Nom. Cap.: £5,000 in £1 shares.

SEWELL TOFFEE COMPANY, LIMITED. (267325.) Carpenters Road, Lozells, Birmingham. To take over the bus. of a mnfg. confectioner formerly cd. on by the late T. W. Sewell at Birmingham. Nom. Cap.: £2,000 in £1 shares.

QUEYRANE AND BURNS, LIMITED. (267659.) To carry on the bus. of fruit and vegetable growers, etc. Nom. Cap.: £500 in £1 shares.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.



These particulars of New Patents of interest to readers have been selected from the Official Journal of Patents, and are published by permission of the Controller of H.M. Stationery Office, and the Official Journal of Patents can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications

21447. Abrahamson, H. V., and Clemmedson, B. A.: Treating milk, etc. July 29.

21237. Champagne, J. P.: Manufacture of chocolate figures coated with tin foil. July 27.

20923. Dunlop, S. (Murray, H. L.): Deodorising cream, milk, etc. July 25.

21022. Pontefract, F.: Airtight container. July 26.

21372. Porteus, G.: Rotary machines for cutting grain. July 29.

Specifications Published

377,256. Vickers, H.: Manufacture of meat rolls.

377,200. Marek, J., and Donner, J.: Internal-capsule for sealing bottles, jars, and other receptacles.

377,330. Manbre and Garton, Ltd., and Berry, E. A.: Packing of invert sugar and like substances for transport.

377,358. Halket, W.: Machine for slicing cooked meats, bread, and the like.

377,365. Boucher-Giles and Co., Ltd., and Hollis, J. M.: Milk and like coolers.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts Published

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per group volume, or in bound volumes price 2s. each.

371,046. **Cutting and slicing potatoes.** Spray, J. W., 42, Oliver Street, and Suggitt, R. W. L., 64, Suggitt's Lane, both in Cleethorpes, Lincolnshire.

A potato-cutting machine of the kind in which a grid-like cutting-member is fitted into a trough containing a reciprocating plunger pivotally attached through a connecting-rod to a crank-shaft, the said plunger having horizontal projections which pass through the cutting-member, and wherein the potatoes are fed into position in the trough through a tapering hopper, comprises a stationary shelf with downwardly projecting wedge-shaped edge, interposed between a feed chamber and cutting box. The knives may be adjusted in their casing, which slides in grooves in the cutting box, for slicing, chipping, or cutting to any desired shape.

371,569. **Preserving fats and fatty oils.** Swift and Co., Union Stock Yards, Chicago, U.S.A. (Assignees of Newton, R. C., and Richardson, W. D., Union Stock Yard, Chicago, U.S.A.)

The oxidation of fats and fatty oils is prevented by adding thereto a carotinoid pigment together with sufficient alkali to neutralise the free fatty acids therein. Coconut, cotton seed, corn or peanut oil or lard is mixed with the carotinoid pigment extracted from carrots or alfalfa leaves, or with substances containing such pigments—*e.g.*, palm oil—thereafter caustic soda is added, and the mixture heated to a temperature between 100° C. and the decomposition temperature of the oil. The heat treatment which decolorises the oil, may be accompanied or followed by purification treatment with alkalies, by filtration through diatomaceous or fuller's earth, by deodorisation with steam or inert gases, or by hydrogenation. In the last treatment the pigment acts as a catalyst.

371,671. **Beverages.** Cornillac, A., 23, Rue des Morillons, Coupeau, M. G., 139, Quai d'Orsay, both in Paris, and Delaville, M., 20, Rue Decorse, St. Maurice, Seine, both in France.

Beverages are obtained free from alcohol by separating the olfactory and gustatory constituents from wine and other alcohol-containing liquids by a solvent for such constituents—for example, paraffin—then removing the alcohol and finally re-incorporating the olfactory, etc., constituents by separating them from the paraffin by a gaseous solvent, such as carbon dioxide, and passing the charged gas through the beverage.

The alcohol is removed by bringing the liquid in a heated and atomised state into contact with water vapour at the same temperature, operating under reduced pressure and at a low temperature.

Bread Broadcasting

Food producers find a new medium for advertising their goods at point of sale in a coloured band, 2½ inches wide, to be placed around loaves of bread as a seal for the paper wrapper. This is advertising not only at the point of sale but in the housewife's own kitchen; additional values lie in the fact that bread is a common display item in many grocery stores. Ad-Seal-It Corporation owns and operates this new medium, sells space for three-day runs on the assumption that a housewife buys a fresh loaf of bread at least once every three days. (*Advertising and Selling.*)

Food Manufacture is sent to any address in the World for 10s. per annum. Send your subscription now to Leonard Hill, Ltd., Thanet House, 231-2, Strand, London, W.C. 2.